THE UNIVERSITY OF ALBERTA

AN INFORMATION-DECISION SYSTEM FOR

MONITORING STUDENT ACADEMIC PERFORMANCE

by

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A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF BUSINESS ADMINISTRATION

FACULTY OF BUSINESS ADMINISTRATION AND COMMERCE

EDMONTON, ALBERTA

SPRING, 1973

ABSTRACT

        This study concerns itself with the problems en-
countered when a computer is added to a manual system of
processing student academic records. A straight manual
system is flexible but tends to become slow when there is
a large volume of data to be processed. The introduction
of a computer to process such a volume is logical and we
show that with the proper definition of decision rules, it
also becomes possible for the computer to be used in the
decision making process. We develop a system in which the
computer can make the academic rulings for most students,
provide both Faculty and students with a clear, concise,
cumulative record of academic performance, permit contin-
uous monitoring of student academic performance, provide
advice and guidance whenever required, yet still keep the
Faculty and not the computer in control.

ACKNOWLEDGMENTS

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CHAPTER I

INTRODUCTION

From the late 1950's on, The University of Alberta

experienced large increases in enrollment and subsequent

large increases in the number of academic programs available

to students which combined to prove the manual system of

processing student records to be inadequate. At about the

same time, tabulating equipment and computers to process

large volumes of data became available. Some routine, high-

volume applications were converted from manual to machine

processing but to accomplish this, some inflexibilities

were introduced into the system. In come cases these proved

to be unacceptable and exceptions were made which reduced

some of the advantages of the machines. As quickly as

machines were incorporated into the system, newer, more

powerful machines were announced by manufacturers and better

programs were developed. Since these machines and programs

seemed better able to handle the exceptions and could also

process more data and applications, more applications were

converted to machine processing with the resulting inflex-

ibilities and consequent exceptions. While these iterations

went on, the enrollment, the variety of academic programs,

changes and therefore the volume and complexity of data to be

processed kept increasing which multiplied the opportunities for errors. The increased error possibilities necessitated additional controls and backup procedures. The outcome of this is that at the University of Alberta there are two almost completely parallel systems--one manual and the other automatic.

Not all universities experienced the same problems. The exceptions invariably are smaller, or newer without the millstone of traditional systems, or they have relatively inflexible, tightly-controlled curriculae. (A number of cases are documented by Koschler [7], Simmons [10], and Zawodny [13]).

For the Faculty of Business Administration and Commerce at The University of Alberta, the result has been that the Faculty Revisions Committee--the body charged with the responsibility of reviewing students' academic performances-- instead of being solely an academic ruling body, has also become a control mechanism in the information flow between Faculty and Registrar and therefore responsible for processing a large volume of data manually in a very short time--relying chiefly on the manually-updated student record card (The Faculty's record of a student's academic history) for accuracy and background information when making its rulings.

The volume and complexity of student data to be processed within the existing system have caused a situation in which processing the records has almost become an end in itself, leaving little time or energy to consider what is being accomplished. Students with problems do not receive the individ-

ual attention they need and the Faculty does not have a good overall picture of the performance of students because neither the necessary time nor the resources are available.

This study shows that a system can be developed within the existing framework which, by utilizing the computer's decision-making ability, can reduce the workload of the Faculty Revisions Committee substantially, provide accurate cumulative and current information for both faculty and students, eliminate the need for the student record card as a control device, yet still allow exceptions by identifying them and bringing them to the attention of the Faculty Revisions Committee. This permits routine cases to be handled by the computer thereby allowing greater attention to be paid to more difficult cases. Difficult cases exist because the rules are not completely defined, errors may have been made or the amount of information to be processed is such that it becomes difficult to apply all of it to the problem. While the problem of defining the rules is beyond the scope of this study, the problem of processing a large amount of information is not. This study shows it is possible to do so by using a computer thereby increasing the number of routine cases which of course, means reducing the number of difficult cases. Even the difficult cases become simpler because more information is now available in a simpler fashion.

Continous monitoring of student records is possible which makes it more likely that errors will be detected early.

The system developed here provides continuous and complete information to students about where they stand in the program and what is expected of them to meet minimum graduation requirements.

Among other benefits for the Faculty is that it facilitates the generation of statistics about performance of special studies or programs. For instance, it might be desirable to monitor transfer students' performance. Input to pre-planning for computerized registration as well as computerized time-tabling is now made much simpler. Finally, since faculty and students receive the same information, misunderstandings about program requirements are likely to be minimized.

CHAPTER II

THE EXISTING SYSTEM

Permission to Register[1]

Students who have not attended the University before, and students who are transferring from one faculty to another, must first obtain permission to register in the faculty of their choice. New and transferring students must submit an application form and a transcript of their grades. Re-enrolling students submit an application for re-enrollment.

Most faculties have delegated the initial screening of applications to the Registrar who admits and rejects clear cases and submits the remainder to the faculty. Once the faculty approves a student's application, the Registrar officially gives him permission to register. Continuing students are not required to re-apply; they need only present themselves for registration.

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[1]This and the following steps are flow-charted in Appendix A.

Registration

With permission to register, the student sometime during registration week, submits to his faculty a list of the courses he plans to take. This is done on the so-called "number 2 card". If he obtains faculty approval of his program, he seeks permission from the teaching departments to be assigned to particular course sections. It must be noted here that, although the faculty can approve a student's choice of courses, only the teaching department is empowered to assign the course section. If the teaching department is unable to assign the student to a given section, or time-tabling conflicts prevent the student from taking a particular course, he must then obtain faculty permission to register in another course and repeat the cycle. Once the student has been assigned course sections, he submits one copy of his program card--the list of courses which constitute his current academic program--to his faculty and one copy to the Registrar. In addition, he receives one Hollerith card --called course card--for every course he plans to take. These are given to the Registrar to form the basis for class enrollment lists.

At this point three separate filing systems show which courses the student is registered in. One file consists of the program cards submitted by the students to their faculties. An identical file exists at the Registrar's office. The third is a computerized file of all the individual course cards.

Post Registration

Within approximately two weeks of registration,
the Registrar sends a duplicate list of students registered
in each section to the teaching departments. The top copy
is meant to be the roll book for the instructor and the
second copy is a class list for the teaching department.

From registration day to the deadline for course
and section changes, changes are requested by students. As
during registration, course changes are approved by the
faculty and section changes by the teaching department.
Copies of these changes are filed by both the faculty and
the teaching department if a course is changed,but only
by the teaching department if a section is changed,and by
the Registrar in either case. Approximately 30,000 of these
changes are received by the Registrar in one winter session.
This figure includes changes made in January regarding second
term courses.

After the deadline for course and section changes,
the Registrar's office produces updated roll books and class
lists. These are sent out in triplicate. One copy becomes
the instructor's roll book and another is a class list for
the teaching department. Any errors or omissions are to be
noted by the teaching department on the third copy which
is returned to the registrar. It is then used for corrections
to the students' records kept by the Registrar.

Examination Results

Shortly prior to examination week, the Registrar sends the examination returns forms to the teaching departments. These forms are the means by which the Registrar and the student's dean are informed of the grades awarded in individual courses. The student's name, identification number and faculty are already on the form when the teaching department receives it. All students from one faculty registered in the same course and section number will appear on one form. Thus for any one course section there will be as many forms as there are faculties represented by the students in that section.

This also means that a student's name will appear on as many forms as the number of courses he is registered in. The students' grades are entered by the teaching departments and copies of the forms distributed. One copy goes to the Registrar, one copy to the student's faculty and one copy is filed by the teaching department. Since there are no teaching departments in the Faculty of Business Administration and Commerce, two copies are filed for Commerce students instead of only one.

The Faculty Revisions Committee

When the grades from the teaching departments have been received by the Registrar, his office produces the work sheets for the Faculty Revisions Committees. The work sheets are lists of students, the courses they were registered

in this academic year and the grades received. They may also

contain the grade point average, the quality index and

instructors' recommendations to grant or withhold supplemental

privileges in case of a failing grade. The Faculty Revisions

Committees are given the following instructions, among others:[1]

> "Grade Points are calculated by multiplying the
> student's grade in a course by the course's weight
> factor. If there is no grade or it is not used
> in computing the student's grade point average,
> the weight factor and grade points will be enclosed
> in brackets and excluded from the totals for those
> columns.
> The grade point average (G.P.A.) is calculated by
> dividing the total grade points by the total weights.
> The results of supplemental examinations are excluded
> from the calculation.
> G.P.A.'s are computed only for students for whom
> no grades are missing from the work sheet.
> If the record for a student was incomplete at the
> time the work sheets were prepared, totals and
> grade point averages will be calculated by computer
> after the missing marks have been entered by the
> Faculty Revisions Committee. Therefore, it is not
> necessary for Revisions Committees to amend totals
> or calculate G.P.A.'s in such cases unless they
> wish to do so for the Faculty records.
> The quality index is used in determining the categori-
> zation of a student.

$$QI = \frac{\text{Number of Credits Passed}}{\text{Numbers of Credits Attempted}} \text{ x Grade Point Averages."}$$

It is the Faculty Revisions Committee's responsibility

to review these records;

a)   to ensure their accuracy and completeness and

b)   to make academic rulings as outlined by University

regulations.[2]

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[1]See Appendix F for complete instructions accompanying
the Faculty Work Sheets.

[2]1972/73 University of Alberta Calendar, sec. 16.

Although the Committee is not responsible for the accuracy of the work of the Registrar's Office, it is responsible for the accuracy of the information submitted by the Faculty and must therefore devise appropriate control procedures. If courses or grades are missing or inaccurate, it is the Committee's responsibility to correct this.

Academic rulings fall into two categories: Rulings on individual courses and rulings on a student's overall academic progress. Course rulings may be one of the following:

C — credit conceded

D — granted deferred final exam

F — failure, no supplemental granted

N — passed, but credit withheld

S — failure, supplemental granted

Rulings on a student's academic progress first place him in one of categories A, B, or C depending on his quality index.

Category A = $QI \geqslant 4.0$

Category B = $4.0 > QI \geqslant 2.0$

Category C = $2.0 > QI$

Generally, these categories determine if he is to be promoted (permitted to continue in the program), must repeat part or all of his program, or must withdraw. Individual faculty or school requirements differ and in special circumstances the Committee may exercise discretionary powers. Secondly, the Committee must also determine:

a) if a student has met graduation requirements

b) if a student has merited academic honors (e.g.
Dean's List, First Class Standing, Graduation with distinc-
tion)

c) if special restrictions are warranted (e.g. a
student from another educational system may be required to
meet certain standards before being allowed to proceed)

d) if special restrictions have been fulfilled.

Final Grade Reporting

After the Faculty Revisions Committee reviews the
work sheets, one copy is returned to the Registrar who uses
these to make the indicated changes on the student master
file. Separate computerized master files are kept for each
winter session, each summer session and for each set of
supplemental and deferred examinations. No cumulative file
exists to date. The information mailed out to notify the
students of their grades is retrieved from the most current
master file. In addition, those faculties who request them,
can obtain gummed labels with the record of the performance
during the current academic year printed on them. These may
be attached to the student record card kept by the faculties.

Registration and Grade Reporting in the Faculty of
Business Administration and Commerce

Shortly after registration week each fall, the
practice in the Faculty has been to copy each student's
courses from his program card to his student's record card,
the idea being to have his complete record in one place. Only
the course names but not the section numbers are copied. Any

changes in registration made by the student are then entered
on his record card but not on his program card. At the end of
each term, the grades are copied onto both the record card
and onto the examination return forms. When the Faculty
Revisions Committee subsequently receives the faculty work
sheets, each student's record card is compared to the list
of courses and grades on the work sheets to ensure compatibility.

In most other faculties, the courses--and later the
grades--are not manually copied onto the student record card.
The gummed labels are used instead. The program card is used
in the interim to keep track of the student's registration.
The difference between the two methods is that, in the Faculty
of Business Administration and Commerce, the record card and
the Faculty Revisions Committee become control mechanisms to
ensure that the Faculty's and the Registrar's information about
the students is the same. In other faculties these two records
have to be the same since the final information about courses
and grades comes from the same source, namely the current
computer file of all students. This does not imply that
other faculties have more accurate records. It only means
that one source of transcription errors is eliminated at the
expense of possibly not detecting other errors.

Comments on the Present System

It must be noted that there are two parallel registration,
grade reporting, and recording systems in existence. One is
manual, the other is partially computerized. This means that

all information must be duplicated and (to ensure that both
systems contain the same information) several controls are
required which would not be necessary if only one system were
maintained.

One obvious example of this is the grade reporting
procedure used. If the computerized system did not exist,
instructors would possibly be able to submit a carbon copy
of their roll books to the Registrar. Under the present
system, clerical staff in the teaching departments must post
the grades from the instructors' roll books to the examination
return forms. The examination return forms are pre-numbered
by computer and when the grades are transferred to machine-
readable form, only the page number and the grade are used.
Because this method relies on proper sequencing for accuracy,
any deletions or additions of names at the teaching department
level cause problems which must first be corrected before the
data is of value to the computerized system. Also, the double
transfer of information, first from roll book to examination
return form and then from examination return form to machine-
readable media, increases the possibility of error.

The Faculty of Business Administration and Commerce
uses a double checking system to ensure that its files contain
the same academic information about students as do the
Registrar's. It can be argued that this system does not
necessarily ensure greater absolute accuracy. Part of the
reason is the volume of data involved. There are some 1.500
students registered in this faculty whose average course load

is almost ten term-courses, which means that around 15,000

course names must be transferred from program cards to record

cards. Some course names are pre-printed on the record card

but some type of notation is still required to indicate whether

or not a student is registered in a certain course.

Between registration week and the deadline for

registration changes (about three weeks later) around 3,000

requests for course and section changes are processed.

Once grades are received from instructors, it is usually

the same person who copies the grades onto both the examination

return forms and onto the student record card. Considering

that this must be done in about two weeks and that each

student's record card must be retrieved up to ten times,

it is unlikely that here and in the prior steps no errors

are made. The same transcription error for instance, could

be made twice and go undetected despite the checking by

the Faculty Revisions Committee.

Nevertheless, the large volume of data to be processed

by the Committee in such a short time makes it difficult

for the Committee to give each student's record the detailed

attention it may require.

CHAPTER III

THE STUDY

Introduction

In this study we develop a computerized system which can

a) Make the academic rulings for most students.

b) Identify those students for whom a Committee decision is not required.

c) Rank students academically each year.

d) Determine if graduation requirements have been met.

e) Eliminate all hand posting of course registration and grades as well as the student record card as a control mechanism.

f) Avoid posting errors and reduce the Committee's importance as a control mechanism ensuring the accuracy of records.

g) Provide both Faculty and students with a clear, concise, cumulative record of academic performance.

h) Inform the student of where he stands in the program and permit him to check for errors.

i) Insure that Faculty and students possess

identical information, and verify that the student is kept

informed of his progress.

j) Permit continuous monitoring of student academic performance and provide advice and guidance whenever required.

Aside from a substantial saving in faculty and clerical staff time, the greatest benefit would be to students by allowing the Faculty to give greater attention to those students requiring it. In addition, avoiding some of the errors in grade reporting and posting which have occurred in the past is equally significant. There have been cases where a student was misinformed about the number of courses required for graduation and his graduation delayed as a consequence. Such errors are of course very grave.

<div align="center">Accuracy of Records</div>

If instructors post the grades in their courses at the completion of the term, then the students could be counted on to report a discrepancy between the grade posted and the grade which the student receives from the Registrar (at least as long as the difference was not the student's favour). If errors in reporting grades can be considered to occur randomly, this procedure should account for approximately half of all errors. The rest would be caught in the procedures outlined below.

There are two feasible methods of reporting grades to the Registrar which differ from the present. One requires

a modification to the present system used in the Faculty of
Business Administration and Commerce but would not require
changes beyond the Faculty. The other, which is more exten-
sive, would eliminate the examination returns form, hence
requiring significant changes in the registration procedure;
this in turn would force changes in every other faculty in
the University.

The first system which is recommended as preferable
requires that the grades be keypunched directly from the
instructors' roll books. Accuracy can then be assured by
using the standard method of verification through redundancy
punching, that is, the records are punched twice except that
the second time they are not actually punched but only compared
electronically against the first punch. Keypunching could
reduce the time required to report grades from around two
weeks to one day (Appendix C).[1] The second system is outlined
in Appendix D.

Either method would eliminate the need to manually
transfer grades to the student record card. If the program
card were kept current by entering course changes on it
instead of transferring the information to the student record
card, considerable clerical time would be saved, no transcription
errors would be introduced, and the Faculty would still have
an accurate current record of the students' registration.

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[1]The present method which requires around two man-
weeks in just Business Administration and Commerce saves
the Registrar only around 106 man-hours when processing
grades for the whole University. (Appendix B).

Creation of a Master File

This system requires that initially a computer master file of student records be created where each record contains the cumulative academic information for one student. The registrar did not have such a cumulative machine-readable file although a separate tape did exist for each session for each year, (winter session, summer session, supplemental and deferred examinations). To minimize incompatibility of the new cumulative tape with the individual tapes, the same type of variable-length, variable-blocked record formats were used although three pieces of information were added to the unused part of the record. These consisted of an indicator to differentiate active from inactive students, the year and lastly the session in which a course was taken. The problem of whether a student is active or inactive is taken care of in the update part of the procedure which considers a student active if he appears on the faculty work sheets and inactive if he does not. All information not contained in the file directly and appearing on subsequent reports is determined by the programs.

The master file of all Commerce students (since 1967/68) is designed to be updated premanently after each session and temporarily prior to the end of the session from the files used to produce the faculty work sheets. After each update, a program analyzes each student's record

to produce the student reports which become the primary

reference documents for the Faculty Revisions Committee.

They show the student's performance to date, summarize it,

recommend academic rulings based on pre-defined criteria,

list remaining requirements, and draw attention to special

cases. The permanent update will record in the student's

record the rulings authorized by the Faculty Revisions Committee.

These may be either the rulings recommended by the program or

those decided on by the Committee.

Initial Performance Evaluation

After the file has been temporarily updated, a

subsequent program evaluates the record of each active student.

For each session (winter and summer), the grade point average

is calculated. For the current session the quality index is

calculated also.[1] Since non-numeric grades may have been

assigned, each grade is evaluated according to Table I. This

is one of the decision tables presently incorporated into

the program, but which can readily be changed. The purpose

of the tables is to separate the logic required to communicate

with the computer from the logic required to analyze student

performance and recommend action. For instance, if the rules

pertaining to performance analysis change, the input-output

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[1]If a course has been repeated, the highest grade
is used to calculate the grade point average but each
failure and/or pass is reflected in the quality index.

operations of the program would not be affected.

In Table 1, all possible grades are on the vertical and all possible qualifying remarks are on the horizontal axis. A letter at the intersection of a row and column specifies how this combination is handled by the program. A "Y" at the intersection indicates that this course is considered to be a pass, an "N" represents a failure, and no entry (neither a failure nor a pass) causes the grade to be omitted from the calculations. The last situation would occur in case of an authorized withdrawal from a course, for instance, or in case of error. A grade of "9" where credit had been withheld would be an example of such an error.

After the grade point average and the quality index have been calculated, the current course load is determined. To do this, the weights of courses with either a numeric grade or a grade of any of "AE", "AB", "CR", "DB", "F", "IN", or "WF" are summed.

The program makes academic rulings based upon the student's current load and quality index in accordance with Table 2. This table represents the system of academic probation and performance currently in use at The University of Alberta with some minor modifications. The computer program is not dependent upon this particular set of criteria; the decision tables can be modified to fit alternative criteria

TABLE 1

CONDITIONS UNDER WHICH CREDIT WILL BE
CONSIDERED GRANTED OR WITHHELD

GRADE	QUALIFYING REMARK							
	no remark	C = credit conceded	D = granted deferred final	F = failure, no supplemental g granted	N = credit withheld	S = failure, supplemental granted	+ = course extra to degree requirements	Any other symbol
AB = absent from final exam	N	Y		N	N	N		
AE = aegrotat standing	Y	Y			N	N		
AU = auditor								
CR = completed requirement no grade assigned	Y	Y					Y	
DB = debarred from final exam	N	Y		N	N	N		
EX = exempt		Y						
F == failure, no grade assigned	N			N	N			
IN = incomplete	N	Y		N	N	N		
RC = registration cancelled								
W = withdrew with permission								
WF = withdrew failing	N			N	N	N		
9	Y	Y					Y	
8	Y	Y					Y	
7	Y	Y					Y	
6	Y	Y					Y	
5	Y	Y					Y	
4	Y	Y		N	N	N	N	
3	N	Y		N	N	N		
2	N			N	N	N		
1	N			N	N	N		
any other grade symbol				N				

provided that the decision rules can be specified with
a certain precision.

Determination of Required Courses Remaining

To determine which required courses remain in the
student's program, a table of required courses and possible
equivalents is set up. If the student is registered in one
of these, the course is evaluated according to Table 1.
If credit has been granted, an indicator representing the
course is set. After all courses have been evaluated for
a student, logical expressions are evaluated for equivalent
courses.

e.g., Econ 301 OR ((Bus 322 OR Bus 323)

AND (Bus 332 OR Bus 333)).

If the expression is TRUE, the indicators for all courses
in the expression are set. If the expression is FALSE,
indicators for courses to the left of OR operators are set
giving due regard for limitations imposed by brackets. All
courses in the table of required courses whose indicators
have not been set are printed as Required Courses Remaining
in the student's program.

In the example above, if a student had received
credit for Bus 323, the indicators for Econ 301, Bus 322
and Bus 332 would be set by the logical expression, and
Bus 333 would remain as a required course.

TABLE 2

RECOMMENDATION DECISIONS

Quality Index	CURRENT COURSE LOAD	
	≥ 30 credits	< 30 credits
QI≥7.5	FIRST CLASS STANDING RETAIN CREDIT FOR ≥ 4.0	CAT A. PROMOTE, (OVERLOAD PERMITTED)
7.5>QI≥5.0	CAT A, PROMOTE, (OVERLOAD PERMITTED) RETAIN CREDIT FOR ≥ 4.0	
6.5>QI≥5.0	CAT A, PROMOTE, (NORMAL LOAD) RETAIN CREDIT FOR ≥ 4.0	RETAIN CREDIT FOR ≥ 4.0
5.0>QI≥4.5		CAT A, PROMOTE (REMAIN ON PARTIAL LOAD) RETAIN CREDIT FOR ≥ 4.0
3.5>QI≥2.0	CAT B, REPEAT YEAR, (NO OVERLOAD) RETAIN CREDIT FOR ≥ 5.0	CAT B, REPEAT YEAR (REMAIN ON PARTIAL LOAD)
3.0>QI≥2.0	CAT B, REPEAT YEAR. (MAX. LOAD ** CREDITS PER TERM) RETAIN CREDIT FOR ≥ 5.0
2.0>QI	**=3 CREDITS LESS THAN PRESENTLY RETAIN CREDIT FOR ≥ 5.0	CAT C, WITHDRAW FROM PROGRAM
	CAT C, WITHDRAW FROM PROGRAM RETAIN CREDIT FOR ≥ 5.0	RETAIN CREDIT FOR ≥ 5.0

The Student Report

Once the evaluations discussed above have been made,
a report[1] is printed for the student showing the following:

- name, address, identification number

- whether visiting, probationary or special student

- registration status[2]

- all courses listed by year. For each course is
shown the description, number, weight, grade received,
ruling by FRC and the academic term[3].

- for each session, the grade point average

- the current load

- total credits earned to date

- for the current session, the quality index

- a summary of the grades received to date also
showing the number of courses and total weight for each grade

- the recommended ruling[4]

- the list of required courses remaining

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[1]Table 3.

[2]The printing of the title "full time winter session"
is suppressed since most students fall in this category.

[3]1=summer session, 2=first half of winter session,
3=second half of winter session, 4=spring session, 5=supple-
mental and deferred exams. Not all codes were printed since
the information was not given.

[4]If it is recommended that credit be withheld for
a grade 3 or 4, the affected courses are noted by "RN"
(Recommend No Credit) in the remarks column.

TABLE 3

STUDENT REPORT

```
STUDENT JOHN Q                    12345
10025 JASPER AVE
EDMONTON ALTA

1968/69                              GR  RM TRM
ACCTG202 03  INTRO ACCING             5
BUS  202 06  INTROD TO BUSINESS       6
ECON 200 06  PRINC OF ECONOMICS       6
ENGL 210 06  ENGLISH LANG & LIT       4
MATH 243 03  ELEMENTARY CALCULUS      5
P ED 218 YR  FITNESS ACTIVITIES      CR
SOC  202 06  INTRO SOCIOLOGY          5

GRADE POINT AVERAGE   156/30  =  5.20

1969/70                              GR  RM TRM
ACCTG204 03  MANAGERIAL CONCEPTS      5
BUS  306 03  INTRO PROBTY & STAT      6
BUS  307 03  PROBABILITY & STAT       5
BUS  322 06  MANAGERIAL ECON          4
BUS  332 06  MANAGERIAL ECON          5
BUS  357 03  INTRO CMPUT FOR BUS      5
MATH 243 03  LINEAR ALGEBRA           5
PSYCO202 06  INTRO GEN PSYCH          5

GRADE POINT AVERAGE   156/33  =  4.73

1970/71                              GR  RM TRM
BUS  304 03  ORGANIZ BEHAVIOUR        5
BUS  310 03  COMMERCIAL LAW           6
BUS  312 03  GOVERNMENT & BUS         3
ECON 351 03  THE PUBLIC SECTOR        5
ECON 352 03  ECON OF PUB FINANCE      W
FIN  304 03  BUSINESS FINANCE         4
IND R304 03  INDUSTRIAL REL           4
MANAG356 03  QUANT METH IN BUS        5
MANAG357 03  QUANT METH IN BUS        5
MARK 304 03  FUNDMTLS OF MARK

GRADE POINT AVERAGE   123/27  =  4.56

1971/72                              GR  RM TRM
BUS  312 03  GOVERNMENT AND BUS      AB
BUS  401 03  THEORY OF FCL MAKNG      5
FIN  401 03  RISK MANAGMENT          AB
FIN  411 03  INVESTMENT PRINC        AB
FIN  421 03  TAX & ESTATE PLANG       W
FIN  421 03  REPEATED 2ND TERM
MARK 403 01  COMMUNCTN PROCESSES      1  P
MARK 405 03  QUANT MARK TECH          3  P
MARK 411 03  MARK FCL &PROG           4  RN
MARK 414 03  CHANNEL MANAGEMENT       1  RN
MARK 418 03  PSYCO-SOCIO APPRCHS     AB

GRADE POINT AVERAGE   042/15  =  2.80
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SUMMARY

NUMBER OF COURSES	TOTAL CREDITS	GRADE	REMARK
4	18	6	
13	45	5	
8	27	4	
1	3	3	RN
1	3	3	P
1	3	1	S
1	3	1	P
4	12	AB	RN
2	6	CR	
3	3	W	

CURRENT LOAD= 27   CURRENT GPA=2.80   TOTAL CREDITS TO DATE= 93

QUALITY INDEX (6/30) X GPA = .56

RECOMMENDATION: CAT C, WITHDRAW FROM PROGRAM
REQUIRED COURSES REMAINING:
BUS 312

This report becomes the working document for the Faculty Revisions Committee. It contains all the information normally on the Faculty Work Sheets as well as the cumulative information presently displayed on the student record card. No action would be required by the Committee regarding students carrying a full course load whose quality index is between 4.5 and 7.5 or regarding students carrying a partial load whose quality index is greater than or equal to 5.0. Students not in these categories and students classed as "visiting", "Probationary", or "special" would require the attention of the Committee.

Until the decision rules have been validated through experience with this system, this check by the Committee would ensure fair treatment for borderline cases but the Committee's work would be simplified because the necessary cumulative information would be on the report. The record of students whose quality index was greater than or equal to 7.5 would also have to be checked to determine if they met requirements for specific academic honors such as the Dean's List.

Under the present system it is necessary for the Committee to indicate on the worksheets all changes and the courses for which credit should be withheld. After the Registrar changes the students' records accordingly, the programs are re-run to permanently update the computer files and to print the reports in duplicate--one copy for faculty files and one copy for the student. This ensures that the student has

been informed of his situation in the Faculty and that the cumulative computer file has been updated to reflect all changes.

The final step is to print a report ranking the students within each year by grade point average. The criteria for academic rank are not presently well defined. It is not specified for instance, which is better--an average of 7 on thirty credit hours or one of 8 on twenty-four. The present program ranks by grade point average using course load only to break ties. Furthermore, only students carrying a course load of more than twenty-three credit hours are included. The course load is used to break ties if possible --a greater course load being assigned a higher rank. If this does not break the tie, all are given the same rank but the next rank to be assigned is calculated as:

R + T; where R = rank assigned, T = number tied.

After all ranks have been calculated, the report is printed in alphabetical order for each year and lists the student's name, his rank, the number of students with this rank, and the course load. A sample of this report is given in Appendix G. Again the present program could easily be modified to implement different ranking criteria.

CHAPTER IV

RECOMMENDATIONS

Although this model meets the given objectives,
some changes would enhance its usefulness if it is to be
implemented as a working system.

Due to factors beyond the control of the Faculty,
some grades are missing from the work sheets although the
course name is shown. It would be useful to scan all
students' records initially and print out a list of missing
grades. These could be investigated and the necessary
records updated.

The present reports and recommendations for
students are printed in alphabetical order within each
year. If these reports were further subdivided, the work
of the Committee would be facilitated since students with
similar academic problems would be grouped. Such groups
could be:

        Category C
        Category B
        Category A, no courses failed
        Category A, one or more prerequisites failed
        Category A, one or more non-prerequisites failed
        Special and probationary students
        Academic honors

Advanced credits present a problem since the
Registrar's computer files do not contain this information.

A suggested solution is to collect this information on some machine-readable medium and use it along with the Registrar's information to update the master file prior to printing the student reports. This method would ensure that a master record for the student had been set up before updating.

A table of courses necessary to meet graduation requirements could be made part of each student's record. His progress would then be monitored against this individualized program thus introducing flexibilities which are not now possible to meet individual requirements.

These and other enhancements which will undoubtedly occur to Faculty as they gain more experience with the system can greatly reduce the work load of many people, can make it possible to give greater attention to students requiring it and, yet, if these enhancements are properly incorporated, still keep the Faculty and not the computer in control.

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APPENDIX A
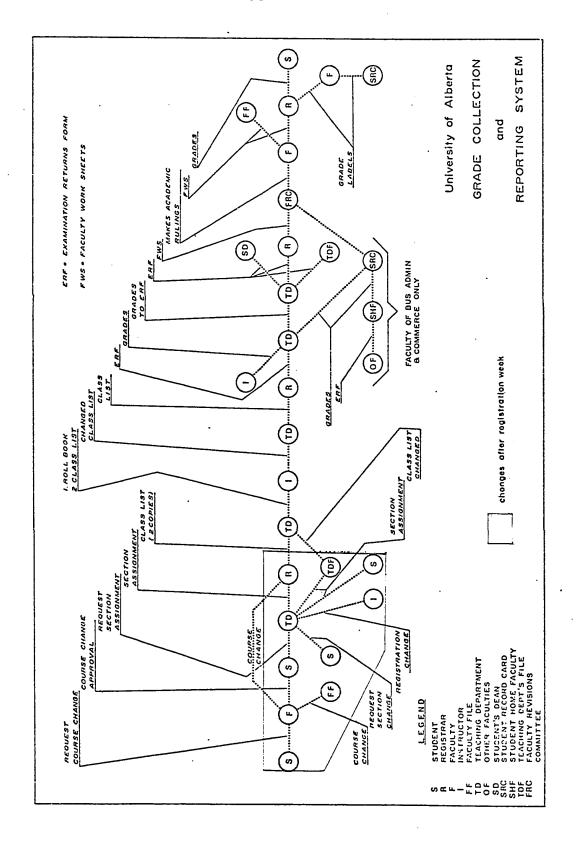
I APPLICATION
2 TRANSCRIPT

SCREENED STUDENT APPLICATION

STUDENTS ACCEPTED

PERMISSION TO REGISTER

PROGRAM APPROVAL

granted

requested

SEEKS SECTION ASSIGNMENT

COURSE CARD

LISTS STUDENTS

CLASS LIST AND ROLL BOOK

CLASS LIST

ROLL BOOK

NOTICE OF COURSE CHANGE

SECTION ASSIGNMENT

changes during registration week

University of Alberta

REGISTRATION SYSTEM

REQUESTS COURSE CHANGE

RECORD OF COURSE CHANGE

COURSE CHANGE APPROVAL

REQUEST SECTION ASSIGNMENT

REQUEST SECTION CHANGE

REGISTRATION CHANGE

SECTION ASSIGNMENT

Note   for Faculty of Business Admin and Commerce
'Teaching Department' is same as 'Faculty'

APPLICATION   SRC SET UP

I COPY OF NO 2 CARD

a   new and transferring
b   re-enrolling after absence
c   continuing
    included

L E G E N D

S	STUDENT
R	REGISTRAR
F	FACULTY
I	INSTRUCTOR
FF	FACULTY FILE
IF	INSTRUCTOR'S FILE
TD	TEACHING DEPARTMENT
TDF	TEACHING DEPT'S FILE
SRC	STUDENT RECORD CARD
SHF	STUDENT HOME FACULTY

University of Alberta

GRADE COLLECTION

and

REPORTING SYSTEM

ERF = EXAMINATION RETURNS FORM

FWS = FACULTY WORK SHEETS

LEGEND

S   STUDENT
R   REGISTRAR
F   FACULTY
I   INSTRUCTOR
FF   FACULTY FILE
TD   TEACHING DEPARTMENT
OF   OTHER FACULTIES
SD   STUDENT'S DEAN
SRC   STUDENT RECORD CARD
SHF   STUDENT HOME FACULTY
TDF   TEACHING DEPT'S FILE
FRC   FACULTY REVISIONS
      COMMITTEE

FACULTY OF BUS ADMIN
& COMMERCE ONLY

changes after registration week

APPENDIX B

CALCULATION OF TIME REQUIRED BY THE REGISTRAR'S
OFFICE TO CONVERT GRADES TO
MACHINE-READABLE FORM

At The University of Alberta the average student
course load is five courses per term which means that
with 18,000 students approximately 90,000 grades must be
processed per term. A student is identified by the computer
by his six-digit identification number. Since presently this
information would have to be keyed either onto cards or
magnetic tape, a total of 7 x 90,000 = 630,000 keystrokes
would be required to first record this information and then
another 630,000 keystrokes would be necessary to verify the
information such as course and section. If an average of
10,000 keystrokes per hour[1] is punched, this means that
approximately 126 man-hours would be required to enter the
information for computer use.

To reduce this time, the Registrar produces pre-
numbered examination return forms and because the location
of each student is known on each page, only the page number
and grade has to be punched. Thus instead of punching about
1,260,000 keystrokes, only about 180,000 strokes are required,
reducing the conversion to machine-readable form to about
eighteen man-hours.

---

[1]IBM classifies keypunch operators punching this type
of data according to the following categories: 8-10,000/hr.
= below average, 10-13,000/hr. = average, 13-16,000/hr. =
above average.

APPENDIX C

CALCULATION OF TIME REQUIRED TO KEYPUNCH ALL
GRADES IN THE FACULTY OF COMMERCE FOR
SUBMISSION TO THE REGISTRAR

The average course load per student in the Faculty

of Business Administration and Commerce is five courses

per term. To identify the student to the computer, the

student's six-digit identification number as well as his

grade would have to be keypunched. Other necessary informa-

tion such as course, section, faculty could be automatically

duplicated and the time for that would be negligible. The

Faculty's enrollment is about 1,500 students. This means

that 7 x 1,500 x 5 = 52,500 keystrokes would be required.

At a conservative 10,000 strokes per hour approximately 5.5

hours would be needed. Verifying requires about the same

amount of time which means that all the grades could be

submitted to the Registrar in one day if two operators were

used[2].

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[2]Data processing practice is to not use the same
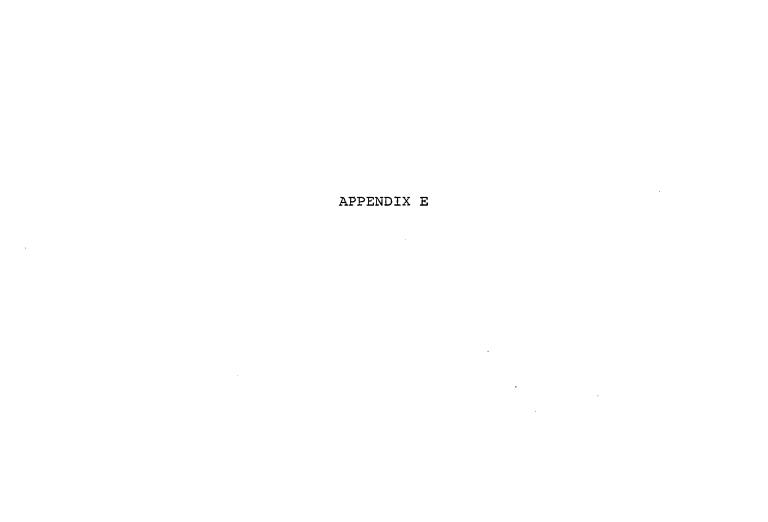operator for verifying and keypunching.

APPENDIX D

PROCEDURE TO ELIMINATE ERRORS IN TRANSCRIBING
GRADES FROM INSTRUCTORS' ROLL BOOKS
TO EXAMINATION RETURNS FORMS

1) After all roll books for a particular course have been received by the Faculty, consecutive numbers are assigned to the students. The last number assigned must be the number of students in the course.

2) The consecutive number assigned to the student is multiplied by the grade he received. Non-numeric grades could be assigned a value of zero or ten. The sum of the products is noted.

3) The sum of the consecutive numbers is calculated

$$\Sigma = \frac{N(N+1)}{2} ; \quad N = \text{number of students in the course}$$

4) The grade and consecutive number are transferred to the examination returns form for the appropriate student home faculty.

5) The multiplication and consequent summing is repeated for each examination return form for each faculty.

6) The consecutive numbers transferred in 4 are summed. This must equal the sum obtained in 3. The sums obtained in 2 and 5 must be equal.

7) If it is desired to update the student record card, the gummed labels made available by the Registrar could be used.

APPENDIX E

PROGRAM LISTING TO PRODUCE STUDENT REPORTS

```
IDENTIFICATION DIVISION.
PROGRAM-ID. CUMULATIVE-PRINTOUT.
AUTHOR. H. KNOPKE.
DATE-WRITTEN. MAY 1, 1972.
DATE-COMPILED.
REMARKS. SELECTS ACTIVE STUDENTS AND PRINTS THEIR
         CUMULATIVE RECORDS.
ENVIRONMENT DIVISION.
CONFIGURATION SECTION.
SOURCE-COMPUTER. IBM-360.
OBJECT-COMPUTER. IBM-360.
SPECIAL-NAMES.
     C01 IS TOP-OF-PAGE.
INPUT-OUTPUT SECTION.
FILE-CONTROL.
     SELECT PRINT-OUT ASSIGN TO UT-S-SYSOUT.
     SELECT TAPE-IN ASSIGN TO UT-2400-S-STUDENT.
     SELECT ID-IN ASSIGN TO UT-S-IDFILE.
     SELECT RANK-OUT ASSIGN TO UT-S-RANK.
DATA DIVISION.
FILE SECTION.
FD   RANK-OUT
     LABEL RECORDS ARE OMITTED
     DATA RECORD IS STU-RANK.
01   STU-RANK.
     02 SR-ID PIC X(6).
     02 SR-NAME PIC X(20).
     02 SR-GPA PIC 9V99.
     02 SR-YR PIC X.
     02 SR-LOAD        PICTURE 999.
     02 SR-CAL-YR      PICTURE 99.
     02 FILLER         PICTURE X(45).
FD   ID-IN
     LABEL RECORDS ARE OMITTED
     DATA RECORD IS ID-FILE.
01   ID-FILE.
     02 ID-FILE-NUM PICTURE X(6).
     02 FILLER         PICTURE X(74).
FD   TAPE-IN
     RECORD CONTAINS 4224 CHARACTERS
     RECORDING MODE IS U
     LABEL RECORDS ARE STANDARD
     DATA RECORD IS STUDENT-FILE.
01   STUDENT-FILE.
     02 FIXED-PART.
        03 STU-ID         PICTURE X(6).
        03 FILLER         PICTURE X(6).
        03 STU-NAME       PICTURE X(20).
        03 FILLER         PICTURE X(25).
        03 STU-YR         PICTURE X.
```

```
   03 FILLER              PICTURE X.
   03 DEG-PAT-A           PICTURE XX.
   03 DEG-PAT-N REDEFINES DEG-PAT-A PICTURE 99.
   03 FILLER              PICTURE X(18).
   03 REG-STAT-A          PICTURE X.
   03 REG-STAT-N REDEFINES REG-STAT-A PICTURE 9.
   03 FILLER              PICTURE X(22).
   03 LOC-ADD-IND         PICTURE X.
   03 LOC-ADD-1           PICTURE X(19).
   03 LOC-ADD-2           PICTURE X(15).
   03 FILLER              PICTURE X(7).
   03 HOME-ADD-IND        PICTURE X.
   03 HOME-ADD-1          PICTURE X(19).
   03 HOME-ADD-2          PICTURE X(15).
   03  FILLER  PIC X(53).
   03  ACTIVE-INDICATOR  PIC 9.
   03  FILLER  PIC X(149).
   03 COURSE-CNT          PICTURE 99.
02 COURSE OCCURS 0 TO 60 TIMES DEPENDING ON
      COURSE-CNT.
   03 C-CODE              PICTURE XXX.
   03 C-ABB                 PICTURE X(8).
   03 C-SUP               PICTURE X.
   03  C-SEC  PIC XX.
   03 C-DES               PICTURE X(19).
   03 FILLER              PICTURE XXX.
   03 C-GRADE             PICTURE XX.
   03 C-REN               PICTURE XX.
   03  C-WT  PIC XX.
   03 FILLER              PICTURE X(19).
   03 C-TERM PIC X.
   03  C-YEAR  PIC 99.
FD  PRINT-OUT
    LABEL RECORDS ARE OMITTED
    RECORD CONTAINS 133 CHARACTERS
    RECORDING MODE IS F
     DATA RECORDS ARE PRINT-LINE-1 PRINT-LINE-2 PRINT-LINE-3
    PRINT-LINE-4 PRINT-LINE-5 SUMMARY-LINE-1 SUMMARY-LINE-2
    SUMMARY-LINE-3 SUMMARY-LINE-4.
01  PRINT-LINE-1.
    02  FILLER PIC X.
    02 STD-NAME PIC X(20).
    02 FILLER   PIC X(10).
    02 STD-ID   PIC X(6).
    02 FILLER             PICTURE X(3).
    02 REG-STAT-PRINT     PICTURE X(44).
    02 DEG-PAT-PRINT      PICTURE X(20).
    02 FILLER             PICTURE X(24).
01  PRINT-LINE-2.
    02  FILLER PIC X.
    02 FIELD-1  PIC X(44).
    02 FIELD-2  PIC X(44).
```

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    02 FIELD-3  PIC X(44).
01  PRINT-LINE-3.
    02   FILLER PIC X.
    02   STD-ADDRESS  PIC X(19).
    02   FILLER  PIC X(113).
01  PRINT-LINE-4.
    02   FILLER PIC X.
    02 ADDRESS-2 PIC X(15).
    02   FILLER  PIC X(117).
01  PRINT-LINE-5.
    02   FILLER PIC X.
    02   FLD1.
    03   FL1  PIC XX.
    03   F2   PIC 99.
    03   F3   PIC X.
    03   F4 PIC 99.
    03   F5   PIC X(37).
    02   FLD2.
    03   FL1  PIC XX.
    03   F2   PIC 99.
    03   F3   PIC X.
    03   F4 PIC 99.
    03   F5   PIC X(37).
    02   FLD3.
    03   FL1  PIC XX.
    03   F2   PIC 99.
    03   F3   PIC X.
    03   F4 PIC 99.
    03   F5   PIC X(37).
01  PRINT-LINE-6.
    02   FILLER PIC X.
    02   FL-1.
    03 FILLER            PICTURE X(44).
    02   FL-2.
    03 FILLER PIC X(44).
    02   FL-3.
    03   FL1  PIC X(22).
    03   FL2  PIC 999.
    03   FL3  PIC X.
    03   FL4  PIC 99.
    03   FL5  PIC XXX.
    03   FL6  PIC Z.ZZ BLANK WHEN ZERO.
    03   FL7  PIC X(9).
01  SUMMARY-LINE-1.
    02 FILLER            PICTURE X.
    02 S-L-1.
     03 FILLER           PICTURE X(16).
     03 S-L-2.
       04 FILLER            PICTURE X(29).
       04 S-L-3            PICTURE ZZ9.
       04 FILLER            PICTURE X(84).
01  SUMMARY-LINE-2.
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      02 FILLER             PICTURE X.
      02 S-L-2A             PICTURE ZZZZ.
      02 FILLER             PICTURE X(10).
      02 S-L-2B             PICTURE ZZZZ.
      02 FILLER             PICTURE X(8).
      02 S-L-2C             PICTURE X(11).
      02 S-L-2D             PICTURE X(95).
  01 SUMMARY-LINE-3.
      02 FILLER PIC X(16).
      02 F22 PIC ZZ9.
      02 FILLER PIC X.
      02 F24 PIC Z9.
      02 FILLER PIC X(10).
      02 F26 PIC Z.ZZ BLANK WHEN ZERO.
      02 FILLER PIC X(97).
  01 SUMMARY-LINE-4.
      02 FILLER             PICTURE X(14).
      02 TEST1              PICTURE ZZ9.
      02 FILLER             PICTURE X(15).
      02 TEST2              PICTURE Z.99.
      02 FILLER             PICTURE X(25).
      02 TEST3              PICTURE ZZ9.
      02 FILLER             PICTURE X(69).
WORKING-STORAGE SECTION.
  77   ID-CTR PIC 999.
  77   ID-SW PIC 9.
  77   ID-CTR-1 PIC 999.
  77   T-GRADE PIC 9999.
  77   AC-IN PIC 9.
  77   WEIGHT PIC 99.
  77   NO-CRS  PIC 99.
  77   FIFTEEN  PIC 99 VALUE 30.
  77   CTR-2 PIC 999.
  77   CRS-CNT  PIC 99.
  77   CR-YR PIC 99.
  77   CAL1  PIC 99.
  77   CAL2  PIC 99.
  77   CAL3  PIC 99.
  77   FIN1  PIC 99.
  77   FIN2  PIC 99.
  77   FIN3  PIC 99.
  77   CAL-YEAR-1 PIC 99.
  77   CAL-YEAR-2  PIC 99.
  77   CTR-1 PICTURE 999 VALUE 0 COMP.
  77   NOW-YR              PICTURE XX.
  77   CUR-YEAR   PIC 99.
  77   COUNTER    PIC 9.
  77   TEST PIC X.
  77   QI-STORE PIC 9V99.
  77   QI-CTR-1 PIC 99.
  77   QI-CTR-2 PIC 99.
  77   WK-CONST            PICTURE 99.
```

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77  HK-CTR-1            PICTURE 999.
77  HK-CUR-LOAD         PICTURE 999.
77  HK-DEC              PICTURE 99.
77  HK-REC              PICTURE 99.
77  HK-CTR-2            PICTURE 999.
77  HK-IND-1            PICTURE 99.
77  HK-IND-2            PICTURE 99.
77  HK1                 PICTURE 99.
77  HK2                 PICTURE 99.
77  HK3                 PICTURE 99.
77  GPA-TEMP PICTURE 9V99.
77  GRADE-TEMP PIC XX.
77  QI-PASS PIC 99.
77  QI-FAIL PIC 99.
77  Q1                  PICTURE 99.
77  Q2                  PICTURE 99.
77  TOTAL-CREDITS       PICTURE 999.
77  X                   PICTURE 99.
77  Y                   PICTURE 99.
77  Z                   PICTURE 99.
01  REG-STAT-TABLE.
    02 RST1.
       03 RST00 PIC X(43) VALUE
       '                   FULL TIME EXTRAMURAL'.
       03 RST01 PIC X(43) VALUE
       '                      SUMMER SESSION'.
       03 RST02 PIC X(43) VALUE
       '                  FULL TIME WINTER SESSION'.
       03 RST03 PIC X(43) VALUE
       'EVENING CREDIT AND FULL TIME WINTER SESSION'.
       03 RST04 PIC X(43) VALUE
       '           PART TIME WINTER SESSION (EDMONTON)'.
       03 RST05 PIC X(43) VALUE
       'EVENING CREDIT AND PART TIME WINTER SESSION'.
       03 RST06 PIC X(43) VALUE
       '                   EVENING CREDIT (OFF-CAMPUS)'.
       03 RST07 PIC X(43) VALUE
       '                      PART TIME EXTRAMURAL'.
       03 RST08 PIC X(43) VALUE
       '          REGISTERED AT AFFILIATED INSTITUTION'.
       03 RST09 PIC X(43) VALUE
       '                       SHORT COURSES'.
    02 RST2 REDEFINES RST1.
       03 REG-STAT OCCURS 10 TIMES PIC X(43).
01  DEG-PAT-TABLE.
    02 DPT1.
       03 DP01 PIC X(20) VALUE 'VISITING STUDENT     '.
       03 DP02 PIC X(20) VALUE 'PROBATIONARY STUDENT'.
       03 DP03 PIC X(20) VALUE 'SPECIAL STUDENT      '.
    02 DPT2 REDEFINES DPT1.
       03 DEG-PAT OCCURS 3 TIMES PIC X(20).
01  REQ-CRS-TAB.
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02 RCT1.
   03 RC01 PIC X(8) VALUE 'ECON 200'.
   03 RC02 PIC X(8) VALUE 'ENGL 210'.
   03 RC03 PIC X(8) VALUE 'MATH 240'.
   03 RC04 PIC X(8) VALUE 'MATH 243'.
   03 RC05 PIC X(8) VALUE 'ACCTG202'.
   03 RC06 PIC X(8) VALUE 'ACCTG204'.
   03 RC07 PIC X(8) VALUE 'BUS  306'.
   03 RC08 PIC X(8) VALUE 'BUS  307'.
   03 RC09 PIC X(8) VALUE 'BUS  308'.
   03 RC10 PIC X(8) VALUE 'BUS  310'.
   03 RC11 PIC X(8) VALUE 'BUS  322'.
   03 RC12 PIC X(8) VALUE 'BUS  325'.
   03 RC13 PIC X(8) VALUE 'BUS  332'.
   03 RC14 PIC X(8) VALUE 'BUS  333'.
   03 RC15 PIC X(8) VALUE 'BUS  357'.
   03 RC16 PIC X(8) VALUE 'PSYCO202'.
   03 RC17 PIC X(8) VALUE 'BUS  302'.
   03 RC18 PIC X(8) VALUE 'BUS  304'.
   03 RC19 PIC X(8) VALUE 'BUS  312'.
   03 RC20 PIC X(8) VALUE 'BUS  355'.
   03 RC21 PIC X(8) VALUE 'FIN  304'.
   03 RC22 PIC X(8) VALUE 'IND R304'.
   03 RC23 PIC X(8) VALUE 'MANAG356'.
   03 RC24 PIC X(8) VALUE 'MANAG357'.
   03 RC25 PIC X(8) VALUE 'MARK 304'.
   03 RC26 PIC X(8) VALUE 'BUS  400'.
   03 RC27 PIC X(8) VALUE 'BUS  401'.
   03 RC28 PIC X(8) VALUE 'ECON 301'.
   03 RC29 PIC X(8) VALUE '        '.
   03 RC30 PIC X(8) VALUE '        '.
02 RCT2 REDEFINES RCT1.
   03 R OCCURS 30 TIMES PIC X(8).
01 CONT-TAB.
02 T OCCURS 30 TIMES PIC 9.
01 PRINT-LINE-7.
   02 FILLER PIC X.
   02 PLL-1.
      03 PLL7 OCCURS 28 TIMES.
         04 PL-COMMA PIC X.
         04 PL-NAME PIC X(8).
   02 PLL-2 REDEFINES PLL-1.
      03 PLL-L PICTURE X(126).
      03 PLL-R PICTURE X(126).
01 REC-TABLE.
   02 RT1.
      03 REC1 PIC X(50) VALUE
      'CAT A, PROMOTE, (OVERLOAD PERMITTED)              '.
      03 REC2 PIC X(50) VALUE
      'CAT A, PROMOTE, (NORMAL LOAD)                     '.
      03 REC3 PIC X(50) VALUE
      'CAT B, REPEAT YEAR, (NO OVERLOAD)                 '.
```

```
       03 REC4 PIC X(50) VALUE
          'CAT B, REPEAT YEAR, (MAX LOAD    CREDITS PER TERM)'.
       03 REC5 PIC X(50) VALUE
          'CAT C, WITHDRAW FROM PROGRAM                       '.
       03 REC6 PIC X(50) VALUE
          'CAT A, PROMOTE, (NORMAL LOAD)                      '.
       03 REC7 PIC X(50) VALUE
          'CAT A, PROMOTE, (REMAIN ON PARTIAL LOAD)           '.
       03 REC8 PIC X(50) VALUE
          'CAT B, REPEAT YEAR, (REMAIN ON PARTIAL LOAD)       '.
       03 REC9 PIC X(50) VALUE
          'CAT C, WITHDRAW FROM PROGRAM                       '.
       03 REC10 PIC X(50) VALUE
          'FIRST CLASS STANDING                               '.
       02 RT2 REDEFINES RT1.
       03 RECOMMEND OCCURS 10 TIMES PIC X(50).
   01 SS-GPA-TABLE.
       02 SS-GPA-STORE OCCURS 6 TIMES PIC 9V99.
   01 QI-TABLE.
       02 QI-ROW OCCURS 21 TIMES.
       03 QI-COL OCCURS 8 TIMES PIC X.
   01 COURSE-CONST-HOLER.
       02 CCH-ABB PIC X(8).
       02 CCH-WT PIC 99.
       02 CCH-GRADE.
       03 CCH-H-GRADE PIC 9.
       03 FILLER PIC X.
   01 GPA-TABLE.
       02 GPA-STORE OCCURS 6 TIMES PIC 9V99.
   01 HK-TAB-1.
       02 HKT-1A.
       03 HKT-1B PIC X(40) VALUE
       '9 8 7 6 5 4 3 2 1 ABAEAUCRDBEXF INRCW WF'.
       03 HKT-1C PIC X(20) VALUE SPACES.
       02 HKT-1D REDEFINES HKT-1A.
       03 HKT-1E OCCURS 30 TIMES PICTURE XX.
   01 HK-TAB-2.
       02 HKT-2A.
       03 HKT-2B PIC X(16) VALUE
       '   C D F H S + RH'.
       03 HKT-2C PIC X(20) VALUE SPACES.
       02 HKT-2D REDEFINES HKT-2A.
       03 HKT-2E OCCURS 18 TIMES PICTURE XX.
   01 HK-GRADE-COLLECT.
       02 HKG-C1 OCCURS 30 TIMES.
       03 HKG-C2 OCCURS 18 TIMES.
       04 HK-GR-NUM PIC 999.
       04 HK-GR-CR  PIC 999.
   01 YR-ROW.
       02  YEAR-REC OCCURS 6 TIMES.
       03  FILLER1  PIC XX.
       03  STRT-YR-1 PIC 99.
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      03   FILLER2  PIC X.
      03   FIN-YR-1  PIC 99.
      03   FILLER  PIC X(37).
01   AVE-LINE-REC.
      02   AVE-LINE OCCURS 6 TIMES.
      03   WORD PIC X(22).
      03   TOT-AVE  PIC 999.
      03   FILLER3  PIC X.
      03   NUM-CRS  PIC 99.
      03   FILLER4  PIC XX.
      03   GPA  PIC  ZZZ.99.
      03   FILLER PIC X(3).
01   SS-AVE-LINE-REC.
      02 SS-AVE-LINE OCCURS 6 TIMES.
       03 SS-WORD PIC X(22).
       03 SS-TOT-AVE PIC 999.
       03 SS-FILLER3 PIC X.
       03 SS-NUM-CRS PIC 99.
       03 SS-FILLER4 PIC XX.
       03 SS-GPA PIC ZZZ.99.
       03 FILLER PIC X(8).
01   MASTER.
      02   STRUCTURE OCCURS 6 TIMES.
      03 COURSE-LIST OCCURS 30 TIMES.
      04 C-ABB     PIC X(3).
      04 FILLER    PIC X.
      04 C-WT      PIC XX.
      04 FILLER    PIC X.
      04 C-DES     PIC X(19).
      04 FILLER    PIC X.
      04 X-GRADE   PIC XX.
      04 FILLER    PIC X.
      04 C-REM     PIC XX.
      04 FILLER PIC XX.
      04 C-TERM PIC X.
      04 FILLER PIC X(4).
01   GRADE-HOLDER.
      03 A-GRADE   PIC X.
      03 N-GRADE REDEFINES A-GRADE   PIC 9.
      03   FILLER PIC X.
01   WT-HOLDER.
      02 WT-A PIC XX.
      02 WT-N REDEFINES WT-A PIC 99.
01   ID-STORE.
      02 ID-NUM-STORE OCCURS 160 TIMES PIC X(6).
PROCEDURE DIVISION.
HSKPG SECTION.
      OPEN INPUT TAPE-IN              OUTPUT PRINT-OUT.
      OPEN INPUT ID-IN.
      OPEN OUTPUT RANK-OUT.
      MOVE 'YYEEEEYE' TO QI-ROW  (1).
      MOVE 'YYEEEEYE' TO QI-ROW  (2).
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       MOVE 'YYEEEEYE' TO QI-ROW  (3).
       MOVE 'YYEEEEYE' TO QI-ROW  (4).
       MOVE 'YYEEEEYE' TO QI-ROW  (5).
       MOVE 'YYENNNNE' TO QI-ROW  (6).
       MOVE 'NYENNNEE' TO QI-ROW  (7).
       MOVE 'NEENNNEE' TO QI-ROW  (8).
       MOVE 'NEENNNEE' TO QI-ROW  (9).
       MOVE 'NYENNNEE' TO QI-ROW (10).
       MOVE 'YYEENNEE' TO QI-ROW (11).
       MOVE 'EEEEEEEE' TO QI-ROW (12).
       MOVE 'YYEEEEYE' TO QI-ROW (13).
       MOVE 'NYENNNEE' TO QI-ROW (14).
       MOVE 'EYEEEEEE' TO QI-ROW (15).
       MOVE 'NEENNEEE' TO QI-ROW (16).
       MOVE 'NYENNNEE' TO QI-ROW (17).
       MOVE 'EEEEEEEE' TO QI-ROW (18).
       MOVE 'EEEEEEEE' TO QI-ROW (19).
       MOVE 'NEENNNEE' TO QI-ROW (20).
       MOVE 'EEEEEEEE' TO QI-ROW (21).
       READ ID-IN AT END ALTER PARA-1 TO PROCEED TO DUMMY.
RD-A-STD.
       READ TAPE-IN AT END GO TO FINIS.
PARA-1. GO TO PARA-2.
PARA-2.
       IF ID-FILE-NUM = STU-ID GO TO DUMMY1.
       IF ID-FILE-NUM > STU-ID GO TO RD-A-STD.
       READ ID-IN AT END GO TO FINIS.
       GO TO PARA-2.
DUMMY.
       MOVE ACTIVE-INDICATOR TO AC-IN.
       IF ZERO = AC-IN OR COURSE-CNT
           GO TO RD-A-STD.
DUMMY1.
       MOVE ZERO TO TOTAL-CREDITS.
       MOVE SPACES TO COURSE-CONST-HOLER.
       MOVE SPACES TO YR-ROW.
       MOVE SPACES TO AVE-LINE-REC.
       MOVE SPACES TO MASTER PRINT-LINE-7.
       MOVE ZEROS TO QI-PASS QI-FAIL.
       MOVE SPACES TO SS-AVE-LINE-REC.
       MOVE SPACES TO CCH-ABB.
       MOVE ZEROS TO CCH-WT CCH-N-GRADE.
       MOVE ZEROS TO GPA-TABLE SS-GPA-TABLE.
       MOVE ZEROS TO CONT-TAB.
DUMMY2.
       MOVE C-YEAR (1) TO CUR-YEAR.
       MOVE 1 TO COUNTER.
       MOVE 1 TO NO-CRS.
       MOVE ZERO TO NUM-CRS (COUNTER).
       MOVE ZERO TO TOT-AVE (COUNTER).
       MOVE ZEROS TO GPA (COUNTER).
       MOVE ZEROS TO STRT-YR-1 (COUNTER).
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      MOVE ZEROS TO FIN-YR-1 (COUNTER).
      MOVE ZEROS TO SS-TOT-AVE (COUNTER).
      MOVE ZEROS TO SS-GPA (COUNTER).
      MOVE ZEROS TO SS-NUM-CRS (COUNTER).
      MOVE COURSE-CNT TO CRS-CNT.
DUMMY3.
      PERFORM E THRU F VARYING TALLY FROM 1 BY 1
      UNTIL TALLY IS GREATER THAN
          CRS-CNT.
      GO TO G.
E.
      MOVE C-YEAR (TALLY) TO CR-YR.
      IF CR-YR IS EQUAL TO
      CUR-YEAR GO TO ASSIGN-COURSES.
E2.
      MOVE '19  /                          GR RM TRM' TO
      YEAR-REC (COUNTER).
      MOVE CUR-YEAR TO STRT-YR-1 (COUNTER).
      ADD 1  CUR-YEAR GIVING FIN-YR-1 (COUNTER).
      MOVE 'GRADE POINT AVERAGE   ' TO WORD (COUNTER).
      MOVE 'SUMMER SESSION GPA' TO SS-WORD (COUNTER).
      MOVE '/' TO FILLER3 (COUNTER) SS-FILLER3 (COUNTER).
      MOVE ' =' TO FILLER4 (COUNTER) SS-FILLER4 (COUNTER).
      IF TOT-AVE (COUNTER) IS GREATER THAN ZERO GO TO E25
        ELSE MOVE ZEROS TO GPA (COUNTER)
      MOVE ZEROS TO GPA-STORE (COUNTER)
      MOVE SPACES TO AVE-LINE (COUNTER)
      GO TO E26.
E25.
      DIVIDE NUM-CRS (COUNTER) INTO TOT-AVE (COUNTER)
          GIVING GPA (COUNTER) ROUNDED.
      DIVIDE NUM-CRS (COUNTER) INTO TOT-AVE (COUNTER)
        GIVING GPA-STORE (COUNTER) ROUNDED.
E26.
      IF SS-TOT-AVE (COUNTER) > 0 NEXT SENTENCE
      ELSE MOVE ZEROS TO SS-GP (COUNTER) S-GPA-STORE
      (COUNTER) MOVE SPACES TO SS-AVE-LINE (COUNTER)
          GO TO E3.
      COMPUTE SS-GPA (COUNTER) ROUNDED = SS-TOT-AVE (COUNTER)
      / SS-NUM-CRS (COUNTER).
      COMPUTE SS-GPA-STORE (COUNTER) ROUNDED =
      SS-TOT-AVE (COUNTER) / SS-NUM-CRS (COUNTER).
E3.
E4.
      MOVE C-YEAR (TALLY) TO CUR-YEAR.
      MOVE 1 TO NO-CRS.
      ADD 1 TO COUNTER.
      MOVE ZEROS TO
      SS-TOT-AVE (COUNTER)
      SS-NUM-CRS (COUNTER)
      SS-GPA (COUNTER).
      MOVE ZEROS TO TOT-AVE (COUNTER).
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        MOVE ZEROS TO NUM-CRS (COUNTER).
        MOVE ZEROS TO GPA (COUNTER).
        MOVE ZEROS TO STRT-YR-1 (COUNTER).
        MOVE ZEROS TO FIN-YR-1 (COUNTER).
ASSIGN-COURSES.
        MOVE CORRESPONDING COURSE (TALLY) TO COURSE-LIST
        (COUNTER, NO-CRS).
        MOVE C-GRADE (TALLY) TO X-GRADE (COUNTER, NO-CRS).
        MOVE C-GRADE (TALLY) TO GRADE-HOLDER GRADE-TEMP.
        MOVE C-WT IN STUDENT-FILE (TALLY) TO WT-HOLDER.
        ADD 1 TO NO-CRS.
        IF WT-HOLDER NOT NUMERIC GO TO F.
        MOVE 20 TO Q1.
        MOVE 7 TO Q2.
        MOVE TALLY TO HK-CTR-1.
        PERFORM GRADE-RULE-DECISION.
        IF TEST = 'Y' ADD WT-H TO TOTAL-CREDITS
        PERFORM COURSE-CONTROL THRU CC-EXIT VARYING X FROM 1 BY
        1 UNTIL X > 28.
CRS-CONT-EXIT.
        IF A-GRADE IS NUMERIC GO TO H
            ELSE GO TO F.
H.
        MULTIPLY WT-H    BY N-GRADE GIVING T-GRADE.
        IF C-TERM IN COURSE (TALLY) = '1'
            ADD T-GRADE TO SS-TOT-AVE (COUNTER)
            ADD WT-N TO SS-NUM-CRS (COUNTER)
            GO TO F.
        ADD T-GRADE TO TOT-AVE (COUNTER).
        ADD WT-N   TO NUM-CRS (COUNTER).
        IF NO-CRS > 1 AND CCH-ABB EQUAL TO C-ABB IN COURSE
        (TALLY) PERFORM GPA-UPDATE THRU GPA-U-END ELSE PERFORM
            COMPARE-MOVE.
F.
G.  PERFORM E2 THRU E3.
CURRENT-LOAD-FIND SECTION.
        MOVE C-YEAR (COURSE-CNT) TO HK-CONST.
        MOVE ZERO TO HK-CUR-LOAD.
        PERFORM C-L-F THRU C-L-F-END VARYING HK-CTR-1 FROM
            COURSE-CNT BY -1 UNTIL HK-CTR-1 LESS THAN 1.
CLF-PAR-1.
        ADD 1 TO HK-CTR-1.
        PERFORM DECISION-TABLE.
        MOVE ZERO TO CTR-2.
        PERFORM GRADE-MODIFICATION THRU GM-END VARYING HK-CTR-2
            FROM HK-CTR-1 BY 1 UNTIL HK-CTR-2 > COURSE-CNT.
EXTRA-1 SECTION.
        MOVE SPACES TO PRINT-LINE-1.
        MOVE STU-ID TO STD-ID.
        MOVE STU-NAME TO STD-NAME.
        IF DEG-PAT-A NUMERIC IF DEG-PAT-N > 96
            SUBTRACT 96 FROM DEG-PAT-N MOVE DEG-PAT (DEG-PAT-N)
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             TO DEG-PAT-PRINT.
         IF REG-STAT-A NUMERIC ADD 1 REG-STAT-N GIVING Q1
             MOVE REG-STAT (Q1) TO REG-STAT-PRINT IF REG-STAT-N
             = 2 MOVE SPACES TO REG-STAT-PRINT.
    I.
         WRITE PRINT-LINE-1 AFTER TOP-OF-PAGE.
         MOVE SPACES TO PRINT-LINE-1.
         IF HOME-ADD-IND IS EQUAL TO ZERO GO
             TO LOCAL.
         MOVE HOME-ADD-1 TO STD-ADDRESS.
    J.
         WRITE PRINT-LINE-3 AFTER ADVANCING 2 LINES.
         MOVE SPACES TO PRINT-LINE-1.
         MOVE HOME-ADD-2 TO ADDRESS-2.
    K.
         WRITE PRINT-LINE-4 AFTER ADVANCING 1 LINES.
         MOVE SPACES TO PRINT-LINE-1.
         GO TO DUMP.
LOCAL.
         MOVE LOC-ADD-1 TO STD-ADDRESS.
         WRITE PRINT-LINE-3 AFTER ADVANCING 2
             LINES.
         MOVE SPACES TO PRINT-LINE-1.
         MOVE LOC-ADD-2 TO ADDRESS-2.
         WRITE PRINT-LINE-4 AFTER ADVANCING 1 LINES.
         MOVE SPACES TO PRINT-LINE-1.
DUMP.
         MOVE YEAR-REC (1) TO FLD1.
         MOVE YEAR-REC (2) TO FLD2.
         MOVE YEAR-REC (3) TO FLD3.
         WRITE PRINT-LINE-5 AFTER 2.
         MOVE SPACES TO PRINT-LINE-1.
         PERFORM A THRU B VARYING TALLY FROM 1 BY
             1 UNTIL TALLY IS GREATER THAN FIFTEEN.
         GO TO N.
    A.
         MOVE COURSE-LIST (1, TALLY) TO FIELD-1.
         MOVE COURSE-LIST (2, TALLY) TO FIELD-2.
         MOVE COURSE-LIST (3, TALLY) TO FIELD-3.
         IF PRINT-LINE-2 = SPACES GO TO N.
         WRITE PRINT-LINE-2 AFTER ADVANCING 1 LINES.
         MOVE SPACES TO PRINT-LINE-1.
    B.
    N.
         MOVE AVE-LINE (1) TO FL-1.
         MOVE AVE-LINE (2) TO FL-2.
         MOVE AVE-LINE (3) TO FL-3.
         IF PRINT-LINE-2 = SPACES NEXT SENTENCE ELSE
         WRITE PRINT-LINE-6 AFTER ADVANCING 2 LINES
         MOVE SPACES TO PRINT-LINE-1.
         MOVE SS-AVE-LINE (2) TO FL-2.
         MOVE SS-AVE-LINE (1) TO FL-1.
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        MOVE SS-AVE-LINE (3) TO FL-3.
        IF PRINT-LINE-2 = SPACES NEXT SENTENCE ELSE
        WRITE PRINT-LINE-6 AFTER 1
        MOVE SPACES TO PRINT-LINE-1.
        MOVE YEAR-REC (4) TO FLD1.
        MOVE YEAR-REC (5) TO FLD2.
        MOVE YEAR-REC (6) TO FLD3.
        IF PRINT-LINE-1 = SPACES GO TO L.
        WRITE PRINT-LINE-5 AFTER 3.
        MOVE SPACES TO PRINT-LINE-1.
        PERFORM C THRU D VARYING TALLY FROM 1 BY 1
             UNTIL TALLY IS GREATER THAN
           FIFTEEN.
        GO TO L.
C.
        MOVE COURSE-LIST (4, TALLY) TO FIELD-1.
        MOVE COURSE-LIST (5, TALLY) TO FIELD-2.
        MOVE COURSE-LIST (6, TALLY) TO FIELD-3.
        IF PRINT-LINE-1 = SPACES GO TO L.
        WRITE PRINT-LINE-2 AFTER ADVANCING 1 LINES.
        MOVE SPACES TO PRINT-LINE-1.
D.
L.
        MOVE AVE-LINE (4) TO FL-1.
        MOVE AVE-LINE (5) TO FL-2.
        MOVE AVE-LINE (6) TO FL-3.
        IF PRINT-LINE-2 = SPACES NEXT SENTENCE ELSE
        WRITE PRINT-LINE-6 AFTER ADVANCING 2 LINES
        MOVE SPACES TO PRINT-LINE-1.
        MOVE SS-AVE-LINE (4) TO FL-1.
        MOVE SS-AVE-LINE (5) TO FL-2.
        MOVE SS-AVE-LINE (6) TO FL-3.
        IF PRINT-LINE-2 = SPACES NEXT SENTENCE ELSE
        WRITE PRINT-LINE-6 AFTER 1
        MOVE SPACES TO PRINT-LINE-1.
    EXTRA-2 SECTION.
        PERFORM GRADE-COLLECTION.
        PERFORM GRADE-COLLECTION-PRINT.
        PERFORM RECOM-PRINT.
        GO TO EXTRA-4.
    GRADE-COLLECTION-PRINT SECTION.
        MOVE SPACES TO SUMMARY-LINE-1.
        MOVE 'SUMMARY' TO S-L-1.
        WRITE SUMMARY-LINE-1 AFTER ADVANCING 2 LINES.
        MOVE ' NUMBER OF      TOTAL        GRADE       REMARK'
             TO SUMMARY-LINE-1.
        WRITE SUMMARY-LINE-1 AFTER ADVANCING 2 LINES.
        MOVE ' COURSES        CREDITS' TO SUMMARY-LINE-1.
        WRITE SUMMARY-LINE-1 AFTER ADVANCING 1 LINES.
        MOVE SPACES TO PRINT-LINE-1.
        PERFORM GC-PRINT-OUT VARYING HK1 FROM 1 BY 1 UNTIL
             HK1 > HK-IND-1.
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RECOM-PRINT SECTION.
      MOVE ' CURRENT LOAD=        CURRENT GPA=
      'TOTAL CREDITS TO DATE=' TO SUMMARY-LINE-4.
      MOVE HK-CUR-LOAD TO TEST1 SR-LOAD.
      MOVE GPA-STORE (COUNTER) TO TEST2.
      MOVE TOTAL-CREDITS TO TEST3.
      MOVE STU-ID TO SR-ID.
      MOVE STU-NAME TO SR-NAME.
      MOVE GPA-STORE (COUNTER) TO SR-GPA.
      MOVE STU-YR TO SR-YR.
      MOVE C-YEAR (COURSE-CNT) TO SR-CAL-YR.
      WRITE STU-RANK.
      WRITE SUMMARY-LINE-2 AFTER ADVANCING 1 LINES.
      MOVE ' QUALITY INDEX (   /   ) X GPA = ' TO PRINT-LINE-1.
      COMPUTE F26 = QI-STORE.
      MOVE QI-PASS TO F22.
      MOVE QI-FAIL TO F24.
      WRITE PRINT-LINE-1 AFTER ADVANCING 2 LINES.
      MOVE ' RECOMMENDATION:' TO SUMMARY-LINE-1.
      MOVE RECOMMEND (HK-REC) TO S-L-2.
      IF HK-REC = 4 COMPUTE S-L-3 ROUNDED =
      (HK-CUR-LOAD - 6) / 2.
      WRITE SUMMARY-LINE-1 AFTER ADVANCING 2 LINES.
      IF T (9) = 1 MOVE 1 TO T (7) T (8) ELSE MOVE 1 TO T (9).
      IF T (28) = 1 MOVE 1 TO T (11) T (13) ELSE MOVE 1
            TO T (28).
      IF T (11) = 1 MOVE 1 TO T (12) ELSE MOVE 1 TO T (11).
      IF T (13) = 1 MOVE 1 TO T (14) ELSE MOVE 1 TO T (13).
      IF T (20) = 1 MOVE 1 TO T (23) T (24) ELSE MOVE 1
            TO T (20).
      IF T (17) = 1 MOVE 1 TO T (18) ELSE MOVE 1 TO T (17).
      IF T (26) = 1 MOVE 1 TO T (27) ELSE MOVE 1 TO T (26).
      MOVE 1 TO Y.
      PERFORM PRINT-COLLECT THRU P-C-END VARYING
      Z FROM 1 BY 1 UNTIL Z > 27.
      IF Y > 1 MOVE ' REQUIRED COURSES REMAINING:'
            TO PRINT-LINE-1 WRITE PRINT-LINE-1 AFTER 1
            SUBTRACT 1 FROM Y MOVE SPACE TO
            PL-COMMA (1) PL-COMMA (15) MOVE
            PLL-L TO PRINT-LINE-1 WRITE
            PRINT-LINE-1 AFTER 1 MOVE
            PLL-R TO PRINT-LINE-1 WRITE
            PRINT-LINE-1 AFTER 1.
RECOM-PR-END. EXIT.
GRADE-COLLECTION SECTION.
      MOVE ZEROS TO HK-GRADE-COLLECT.
      MOVE 20 TO HK-IND-1. MOVE 7 TO HK-IND-2.
      PERFORM GR-COLL THRU GR-COLL-END VARYING HK1 FROM
            1 BY 1 UNTIL HK1 > COURSE-CNT.
      GO TO G-C-END.
GR-COLL.
      PERFORM GRADE-TAB THRU GTEXIT VARYING HK2 FROM 1 BY 1
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            UNTIL HK2 > HK-IND-1.
        MOVE HK2 TO HK-IND-1.
        MOVE C-GRADE (HK1) TO HKT-1E (HK2).
GR-COLL-1.
        PERFORM REM-TAB THRU RTEXIT VARYING HK3 FROM 1 BY 1
            UNTIL HK3 > HK-IND-2.
        MOVE HK3 TO HK-IND-2.
        MOVE C-REM IN COURSE (HK1) TO HKT-2E (HK3).
GR-COLL-2.
        ADD 1 TO HK-GR-NUM (HK2, HK3).
        MOVE C-WT IN COURSE (HK1) TO WT-HOLDER.
        IF WT-A NUMERIC ADD WT-N TO
        HK-GR-CR (HK2, HK3).
GR-COLL-END. EXIT.
G-C-END. EXIT.
DECISION-TABLE SECTION.
        MOVE ZERO TO HK-DEC HK-REC.
        MOVE GPA-STORE (COUNTER) TO GPA-TEMP.
        ADD QI-PASS TO QI-FAIL.
        IF QI-FAIL = ZERO COMPUTE QI-STORE = 0 ELSE
        COMPUTE QI-STORE ROUNDED =
        (QI-PASS / QI-FAIL) * GPA-STORE (COUNTER).
        IF HK-CUR-LOAD IS LESS THAN 30 GO
            TO LESS-THAN-30.
        IF QI-STORE < 7.5 NEXT SENTENCE ELSE
            MOVE 10 TO HK-REC MOVE 1 TO HK-DEC GO TO DT-EXIT.
        IF QI-STORE < 6.5 NEXT SENTENCE ELSE
            MOVE 1 TO HK-REC MOVE 1 TO HK-DEC GO TO DT-EXIT.
        IF QI-STORE < 4.5 NEXT SENTENCE ELSE
            MOVE 2 TO HK-REC MOVE 1 TO HK-DEC GO TO DT-EXIT.
        IF QI-STORE < 3.5 NEXT SENTENCE ELSE
            MOVE 3 TO HK-REC MOVE 2 TO HK-DEC GO TO DT-EXIT.
        IF QI-STORE < 2.0 NEXT SENTENCE ELSE
            MOVE 4 TO HK-REC MOVE 2 TO HK-DEC GO TO DT-EXIT.
            MOVE 5 TO HK-REC MOVE 2 TO HK-DEC GO TO DT-EXIT.
    LESS-THAN-30.
        IF QI-STORE < 5.0 NEXT SENTENCE ELSE
            MOVE 6 TO HK-REC MOVE 1 TO HK-DEC GO TO DT-EXIT.
        IF QI-STORE < 4.5 NEXT SENTENCE ELSE
            MOVE 7 TO HK-REC MOVE 1 TO HK-DEC GO TO DT-EXIT.
        IF QI-STORE < 3.0 NEXT SENTENCE ELSE
            MOVE 8 TO HK-REC MOVE 2 TO HK-DEC GO TO DT-EXIT.
            MOVE 9 TO HK-REC MOVE 2 TO HK-DEC GO TO DT-EXIT.
DT-EXIT. EXIT.
GRADE-RULE-DECISION SECTION.
        PERFORM QI-FIND THRU QI-F-END VARYING QI-CTR-1
            FROM 1 BY 1 UNTIL QI-CTR-1 > Q1.
        SUBTRACT 1 FROM QI-CTR-1.
QI-1-EXIT.
        PERFORM QR-FIND THRU QR-END VARYING QI-CTR-2
            FROM 1 BY 1 UNTIL QI-CTR-2 > Q2.
        SUBTRACT 1 FROM QI-CTR-2.
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QI-2-EXIT.
    MOVE QI-COL (QI-CTR-1, QI-CTR-2) TO TEST.
    GO TO G-R-D-END.
QI-FIND.
    IF GRADE-TEMP = HKT-1E (QI-CTR-1) GO TO QI-1-EXIT.
QI-F-END.
QR-FIND.
    IF C-REM IN COURSE (HK-CTR-1) = HKT-2E (QI-CTR-2)
        GO TO QI-2-EXIT.
QR-END. EXIT.
G-R-D-END. EXIT.
MISC-ROUTINES SECTION.
PRINT-COLLECT.
    IF T (Z) NOT EQUAL TO 1 MOVE
    R (Z) TO PL-NAME (Y) MOVE ',' TO PL-COMMA (Y) ADD
        1 TO Y.
P-C-END. EXIT.
COURSE-CONTROL.
    IF R (X) = C-ABB IN COURSE (HK-CTR-1)
        MOVE 1 TO T (X) GO TO CRS-CONT-EXIT.
CC-EXIT. EXIT.
C-L-F.
    IF C-YEAR (HK-CTR-1) IS NOT EQUAL TO HK-CONST
    GO TO CLF-PAR-1.
    MOVE C-WT IN COURSE (HK-CTR-1) TO WT-HOLDER.
    IF WT-A NOT NUMERIC GO TO C-L-F-END.
    IF C-TERM IN COURSE (HK-CTR-1) = '1' GO TO C-L-F-END.
    MOVE C-GRADE (HK-CTR-1) TO GRADE-TEMP GRADE-HOLDER.
    IF ((A-GRADE     IS NUMERIC) OR
        (GRADE-TEMP = 'AB') OR
        (GRADE-TEMP = 'AE') OR
        (GRADE-TEMP = 'CR') OR
        (GRADE-TEMP = 'DB') OR
        (GRADE-TEMP = 'F ') OR
        (GRADE-TEMP = 'IN') OR
        (GRADE-TEMP = 'WF')) ADD
    WT-N TO HK-CUR-LOAD.
    MOVE 20 TO Q1.
    MOVE 1 TO Q2.
    PERFORM GRADE-RULE-DECISION.
    IF TEST = 'Y' ADD WT-N TO QI-PASS.
    IF TEST = 'N' ADD WT-N TO QI-FAIL.
C-L-F-END. EXIT.
GRADE-MODIFICATION.
    ADD 1 TO CTR-2.
    MOVE C-GRADE (HK-CTR-2) TO GRADE-HOLDER.
    IF A-GRADE NOT NUMERIC GO TO GM-END.
    IF C-REM IN COURSE (HK-CTR-2) NOT = SPACES GO TO GM-END.
    IF HK-DEC = 1 GO TO GM-1.
    IF N-GRADE < 5 MOVE
        'RN' TO C-REM IN COURSE (HK-CTR-2)
    C-REM IN COURSE-LIST (COUNTER, CTR-2).
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        GO TO GM-END.
GM-1.
        IF N-GRADE < 4 MOVE 'RN' TO C-REM IN COURSE (HK-CTR-2)
        C-REM IN COURSE-LIST (COUNTER, CTR-2).
GM-END. EXIT.
GRADE-TAB.
        IF HKT-1E (HK2) = C-GRADE (HK1) GO TO GR-COLL-1.
GTEXIT. EXIT.
REM-TAB.
        IF HKT-2E (HK3) = C-REM IN COURSE (HK1) GO TO GR-COLL-2.
RTEXIT. EXIT.
GC-PRINT-OUT.
        PERFORM GC-P-2 THRU GCP2EXIT VARYING HK2 FROM 1 BY 1
            UNTIL HK2 > HK-IND-2.
GC-P-2.
        IF HK-GR-NUM (HK1, HK2) NOT = ZERO
            MOVE SPACES TO SUMMARY-LINE-2 MOVE
            HK-GR-NUM (HK1, HK2) TO S-L-2A MOVE
            HK-GR-CR (HK1, HK2) TO S-L-2B MOVE
            HKT-1E (HK1) TO S-L-2C MOVE
            HKT-2E (HK2) TO S-L-2D WRITE
            SUMMARY-LINE-2 AFTER ADVANCING 1 LINES.
GCP2EXIT. EXIT.
GPA-UPDATE.
        IF CCH-N-GRADE > N-GRADE
        COMPUTE TOT-AVE (COUNTER) =
        TOT-AVE (COUNTER) - WT-N * N-GRADE
        COMPUTE NUM-CRS (COUNTER) =
        NUM-CRS (COUNTER) - WT-N ELSE
        COMPUTE TOT-AVE (COUNTER) =
        TOT-AVE (COUNTER) - CCH-WT * CCH-N-GRADE
        COMPUTE NUM-CRS (COUNTER) =
        NUM-CRS (COUNTER) - CCH-WT
        PERFORM COMPARE-MOVE.
GPA-U-END. EXIT.
COMPARE-MOVE.
        MOVE C-ABB IN COURSE (TALLY) TO CCH-ABB.
        MOVE WT-N TO CCH-WT.
        MOVE N-GRADE TO CCH-N-GRADE.
EXTRA-4 SECTION.
        GO TO RD-A-STD.
FINIS.
        MOVE ' END OF PROGRAM' TO PRINT-LINE-1.
        WRITE PRINT-LINE-1 AFTER TOP-OF-PAGE.
         CLOSE TAPE-IN PRINT-OUT.
        CLOSE ID-IN.
        CLOSE RANK-OUT.
        STOP RUN.
```

APPENDIX F

REVISIONS COMMITTEE WORK SHEETS[1]

Format

On the Revisions Committee Work Sheets appears a
summary of student results reported by the teaching staff.
An explanation of symbols used by instructors and already
printed in the "INSTRUCTOR" column on the Work Sheets,
follows:

     In the "GRADE" column   In the "REC" column

AB - absent from final exam
AU - auditor
CR - completed course
     requirements
*DB - debarred from final exam
 EX - exempt
 F - fail
*IN - incomplete
*RC - registration cancelled
*W - withdrew with permission
*WF - withdrew failing

    - if the "GRADE" column is blank, no Examination Return
     has been received for the course. Please contact the
     instructor.

*These entries should have been used by an instructor, only
with the approval of the Dean concerned.

Instructions

If the grade and recommendations made by instructors
are completely acceptable, no entries are required in the

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[1]Registrar, University of Alberta, 1972, *Instructions
for Faculty Revisions Committees.*

red-shaded columns headed "FACULTY."

If the Instructor's recommendation (F or S) is
not acceptable, please complete this form by inserting
BOTH THE GRADE AND THE REVISED RULING in the FACULTY column.

If a missing grade or a revised grade is obtained
from an instructor, it should be entered in the FACULTY
column.

If a grade of "AB" is shown, a ruling should be
entered in the FACULTY column and shown as "AB F" or
"AB D."

If a grade of "3" is shown, a ruling should normally
be entered in the FACULTY column and shown as "3 F" or
"3 S" or "3 C."

If a grade of "2" or "1" is shown, a ruling must
be entered in the FACULTY column.

If a course is extra to the degree program, this
should be indicated by writing "+" in the appropriate
red-shaded column.

Accepted Symbols

Use only the following symbols, which correspond
to the symbols explained for students on the Statement of
Results. Other symbols cannot be accepted.

In the "GRADE" column   In the "RULING" column

AB - absent from final exam

AE - granted aegrotat standing

AU - auditor

CR - completed course requirements

DB - debarred from final exam

EX - exempt

F - fail

IN - incomplete

RC - registration cancelled

W - withdrew with permission

WF - withdrew failing

C - credit conceded

D - granted deferred final exam

F - failure, no supplemental granted

N - passed, but credit withheld

S - failure, supplemental granted

In the "+" column

+ - course extra to degree requirements

Grade Points

Grade Points are calculated by mutiplying the student's GRADE in a course by the course's WEIGHT FACTOR. If there is no grade or it is not used in computing the student's Grade Point Average, the Weight Factor and Grade Points will be enclosed in brackets and excluded from the totals for those columns.

Grade Point Average

Grade Point Average (G.P.A.) is calculated by dividing the total Grade Points by the total Weights. The results of Supplemental Examinations are excluded from the calculation.

G.P.A.'s are computed only for students for whom no Grades are missing from the Work Sheet.

If the record for a student was incomplete at the time the Work Sheets were prepared, Totals and Grade Point

Averages will be calculated by computer after the missing marks have been entered by the Faculty Revisions Committee. Therefore, it is not necessary for Revisions Committees to amend Totals or calculate G.P.A.'s in such cases unless they wish to do so for the Faculty records.

Quality Index

The Quality Index is used in determining the categorization of a student.

$$QI = \frac{\text{Number of Credits Passed}}{\text{Number of Credits Attempted}} \times \text{Grade Point Average}$$

Rentention of Credit

Students retain credit in subjects in which they achieve a grade of 5 or higher, when made Category "C" or for other reasons are required to repeat all or most of a year.

Category A

A student would be placed in Category "A" if he achieves a Quality Index of 4.0 or higher. He is promotable, unless the promotion requirements of a faculty or school dictate otherwise. In some instances the writing of a supplemental may be required, or there may be denial of credit in one subject because of poor grade.

Category B

A student will be placed in Category "B" if he achieves a Quality Index of greater than 2.0 and less than 4.0. Individual decision will be required with respect to the granting of supplemental privileges and the requirement to repeat all or part of the work taken. If required to repeat, he will retain credit in any subject in which a grade of 5 or higher has been achieved. Such a student may be advised that he is in danger of failing to meet the requirements for promotion or graduation, and he may be advised to consult the Student Counselling Services with respect to his vocational and academic plans.

Category C

A student would be placed in Category "C" if the Quality Index is 2.0 or less. While he would retain credit in any subject in which he achieved a grade of 5 or higher he would not be granted supplementals and would be required to withdraw from the Faculty in which he was last registered. A second registration would not be permitted until the Dean is reasonably satisfied that it is likely that the student will be able to make satisfactory academic progress (normally a minimum of one year would be required for this purpose). The Dean of the Faculty may require counselling and a report from the Director of the Student Counselling Services is seeking to evaluate an application for re-admission.

Students in Quota Faculties Who Fail to Meet
Promotion Requirements

Students in the Faculties of Dentistry, Law, or
Medicine, or the School of Dental Hygiene or Rehabilitation
Medicine, who have failed to meet promotion standards but
do not have Quality Indexes that would place them in either
Category "B" or "C," will not be placed in these categories.

Academic Ruling

After the student's record has been reviewed, an
academic ruling may be entered in the REMARKS column.
Some of the rulings appropriate for your Faculty are given
on the attached sheet.

When Revisions Committee Work Sheets are complete,
please hand deliver to the Office of the Registrar, or
phone 3852, and we will arrange to have them picked up.
Please do not mail.

APPENDIX G

SAMPLE STUDENT RANKING REPORT

1971/72 CLASS STANDING IN YEAR 1 FOR 381 STUDENTS

NAME	ID NO.	RANK			GPA	LOAD
CAMPBELL R	368302	19	(4	TIED)	7.10	30
CARSON G	253864	32	(2	TIED)	6.80	30
CARTER M	283079	10			7.50	30
CHAN A C	397461	252	(8	TIED)	4.80	30
CHAPMAN A B C	293584	225	(3	TIED)	5.13	24
CHRISTENSON T Y	257443	210			5.25	30
CLARK X YZ	353666	297	(2	TIED)	4.44	30
COLLINS A B	230744	67	(4	TIED)	6.40	30
COOPER R R	314334	231	(6	TIED)	5.10	30
CROSS G W	360481	102	(10	TIED)	6.00	30
DAVIES R M	206611	48	(14	TIED)	6.50	30
DIXON W K	306890	357	(5	TIED)	3.70	30
DONALD J G	299696	351	(4	TIED)	3.80	30
DOUGLAS E A	391072	357	(5	TIED)	3.70	30
DUNN F R G	349658	252	(8	TIED)	4.80	30
EDMONTON A C	310917	71			6.38	30
EVANS A B	378147	25	(7	TIED)	6.90	30
FITZGERALS L J	324970	216	(6	TIED)	5.20	30
FITZPATRICK Y T	368408	357	(5	TIED)	3.70	30
FLEMING J K	231954	231	(6	TIED)	5.10	30
FOX Q W	242551	344	(2	TIED)	4.00	24
FREEMAN W R	324942	114	(6	TIED)	5.90	30
FRENCH A B	226086	102	(10	TIED)	6.00	30
GARDNER A J T	218918	24			7.00	30
GIBSON J H	254918	93	(8	TIED)	6.10	30
GORDON B B	200600	251			4.88	27
GRAHAM G L	282859	102	(10	TIED)	6.00	30
GREEN J P	205376	48	(14	TIED)	6.50	30
HALL A D	341964	42	(4	TIED)	6.60	30
HANSEN A J	387579	197	(13	TIED)	5.30	30
HENDERSON B K	247982	42	(4	TIED)	6.60	30
HENDRICK H K	236180	67	(4	TIED)	6.40	30
HOLMES SHERLOCK	236180	145	(4	TIED)	5.67	30
HUGHES M E	236180	196			5.30	33
JAMES M M	263508	7			7.70	30
JOHNSON B E	377398	168	(3	TIED)	5.50	24
JONES P O	330412	299	(3	TIED)	4.44	27
KELLY D K	336269	76	(8	TIED)	6.30	30
KING F G	277163	252	(8	TIED)	4.80	30
KLEIN A H	299948	245	(3	TIED)	4.90	30
KOWALSKI	277545	12	(3	TIED)	7.30	30