

## Extra Practice in Pseudocode and flowcharts 2009

**PART 6 Slide 54****Question 1**

Pseudocode and decision tables are tools that programmers use to help specify the logic for computer processes.

**Required**

- a. Specify the pseudocode for the following process to check a student registration for possible errors.

Fetch the next student registration form from the registration file. Take each course on the registration form and look up course identification from the available course file. If the course identification is incorrect, print the student registration form and flag the error. If the course identification is correct, calculate the course fee. If the course fee is incorrect, print the student registration form and flag the error.

- b. Draw a decision table for the following policy of an educational institution that gives discounts on tuition fees. Students in their second year get a 5% discount on tuition. Students who pay within 3 weeks receive a 2% discount and an additional 3% if their tuition fees are over \$3,000.
- c. Draw the Program Flowchart for part (a) above

**PART 6 Slide 55****Question 2**

United Rentals is a large equipment rental company in Winnipeg. It rents equipment such as floor sanders, lawn mowers, and paint sprayers, and is the biggest rental company in Winnipeg. United Rentals uses MS-Access to store data on the equipment it rents out and the manufacturers of the equipment. The contents of the Equipment Table are the following: Equipment Number (5 numerics), Equipment Name (25 characters), Equipment Manufacturer (25 characters), and Rental Price (6 numerics, 2 decimal places). The contents of the Manufacturers Table are the following: Manufacturer Number (5 numerics), Manufacturer Name (25 characters), Manufacturer Address (25 characters), and Phone Number (8 characters). From the Equipment Table, a report is produced that shows only the equipment whose rental price is over \$500.00. This equipment will receive special maintenance treatment.

**Required**

- a. Write the pseudocode for the logic that would produce the "Over \$500 Equipment" report.

**PART 6 Slide 56****Question 3**

a. Draw a physical data flow diagram for the following process:

*Student Registration at Auckland College*

A student can register for a course at Auckland College by filling out a registration form or by calling the Registrar's office at the college and speaking to a registration assistant (RA), who will enter the registration data into the computer system. The RA will check the course registration file to determine if space is still available in the course. If it is, then the registration will be processed by the Registration Database Program, which updates the course registration file, sends an updated class list to the instructor, and prompts the Financial Services Department to create an invoice and send it to the student. If there is no space available, the Registration Database Program will create a letter to the student stating that the course is currently full and when the course will be offered next.

**PART 6 Slide 57****Question 4 December 2000 15 Question 4**

Data flow diagrams (DFDs) are one of the systems analyst's major tools.

**Required**

- a. Explain the difference between physical and logical DFDs.
- b. Assume you are a systems analyst whose job it is to develop a new order entry system from a current automated order entry system. Outline the sequence in which you would use physical and logical DFDs to analyze and design the new system.
- c. Draw a physical DFD from the following physical description of an accounts payable system.
  - i) Suppliers send invoices to the accounts payable department.
  - ii) Invoices are coded by the accounts payable department and then sent to the IS-data entry department.
  - iii) The IS-data entry department keys in the data from the invoice using an online edit program, which checks the data against the supplier file.
  - iv) Invalid invoices are rejected and a summarized error report is sent back to the accounts payable department.
  - v) Valid invoices are stored in the valid invoice file for batch processing overnight using the update program.
  - vi) The update program also updates the accounts payable file and the supplier file.
  - vii) The Accounts Payable Status Report is sent to the accounts payable manager.

**PART 6 Slide 58****Question 5 June 2001**

Royal Ottawa Golf and Country Club (ROGCC) is a large private club that includes 2 championship golf courses, 6 squash courts, and a curling rink. The ROGCC has 22 types of memberships, for example, a Family Squash Membership, a Regular Male Golf Membership, and a Regular Female Curling Membership. The club currently has 3,000 members. The club's membership system is an old manual system that the Membership Committee would like to replace with a computer-based system using MS-Access as the database management system. The current membership system includes the following steps:

- i) A prospective member fills out a membership application form.
- ii) The membership clerk checks the form for completeness, creates a manual file, and then puts the file in the "Pending Applications" file drawer.
- iii) The Membership Committee meets once a month to approve or reject membership applications.
- iv) For an approved application, a letter is sent back to the prospective member by the membership clerk, acknowledging membership approval along with a bill for membership fees. A new file is created for the new member and put in the "Current Members" file drawer.
- v) For rejected applications, a letter is sent back to the applicant by the membership clerk, notifying the applicant of non-acceptance. The file is then put in the "Rejected Applications" file drawer and kept for 3 years.

For the new MS-Access database system, the Membership Committee would like to keep the following information on its members: member name, member address, membership type and membership fees for up to 3 different memberships (one member can have multiple memberships), total fees billed, and total fees paid. The committee considers this the new "Member File." The committee would also like a new report that lists all members who have not paid their total fees that have been billed.

**Required**

- a. Draw a physical data flow diagram of the *current* membership system.
- b. Write a data dictionary entry for the new Member File in the new database.
- c. Write the pseudocode that would show the logic to print the new report on members who have not paid total fees.

**PART 6 Slide 54****Question 1 (solution)**

a. Psuedocode

```

START
  Open the student registration file
  DOWHILE there are more student registrations in the file
  Fetch student registration
    DOWHILE there are more courses on the student registration
    Get next course
    Look up Course-ID in the course file
      IF Course-ID does not match that on student registration
        THEN write error record
      ELSE calculate course fee
    Endif
    IF course fee does not match calculated course fee
      THEN write error record
    Endif
  ENDDO
ENDDO
STOP
Note:

```

1/2 mark for each correct psuedocode statement in the correct logical position to a maximum of 7 marks. 1 mark for overall logical structure. Minor variations are acceptable as long as the logic is correct.

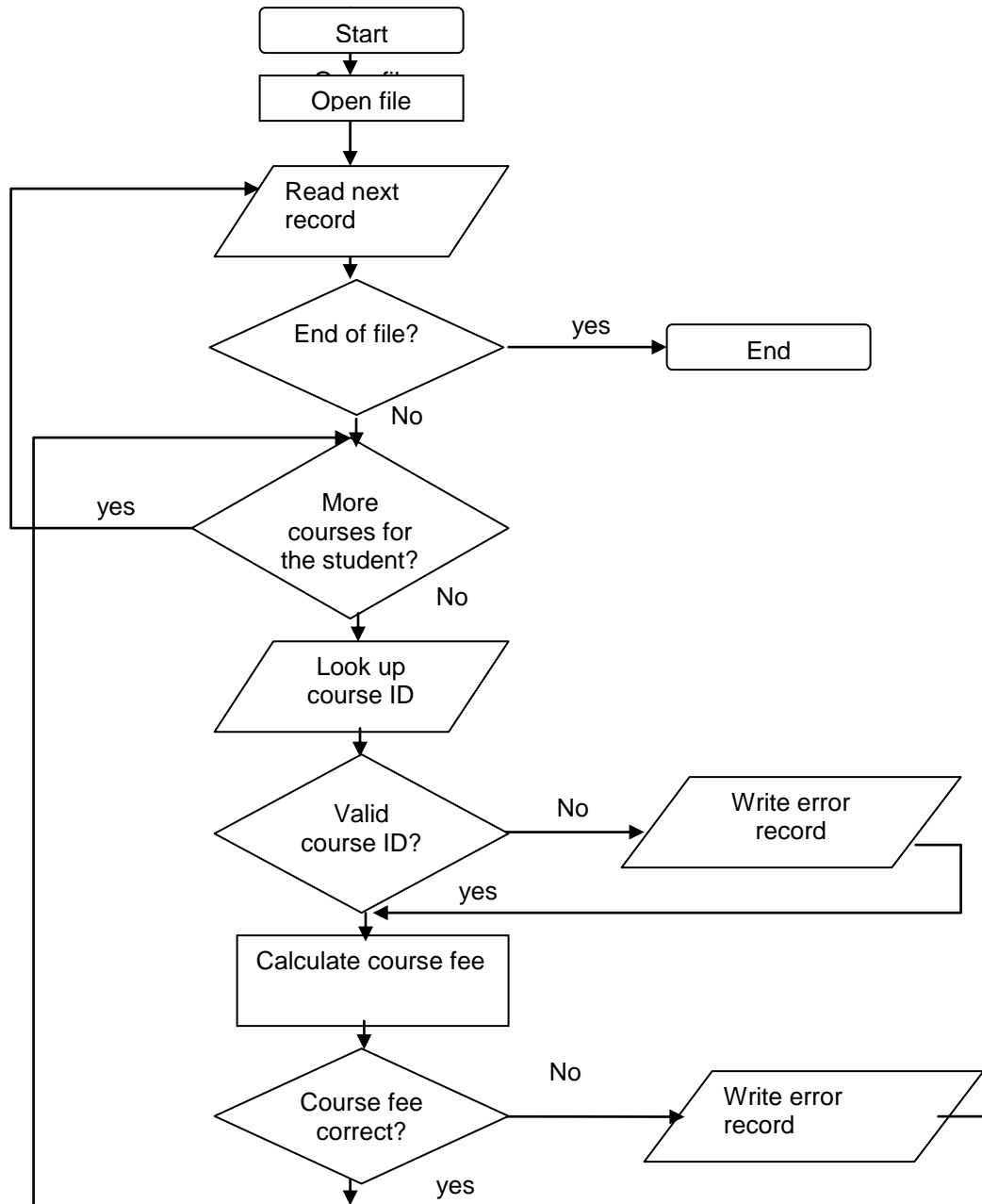
b. Decision Table

Conditions	Rules					
Second-year students	Y			Y	Y	N
Pay within 3 weeks		Y	Y	Y	Y	N
Tuition fees over \$3,000			Y		Y	N
<b>Action</b>						
Discount 5%	X			X	X	
Discount 2%		X	X	X	X	
Discount 3%			X		X	
No discount						X

**Note:** 1/2 mark for each correct condition and action and 1/2 mark for each correct rule to a maximum of 6 marks; 1 mark for correct overall structure.

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c.

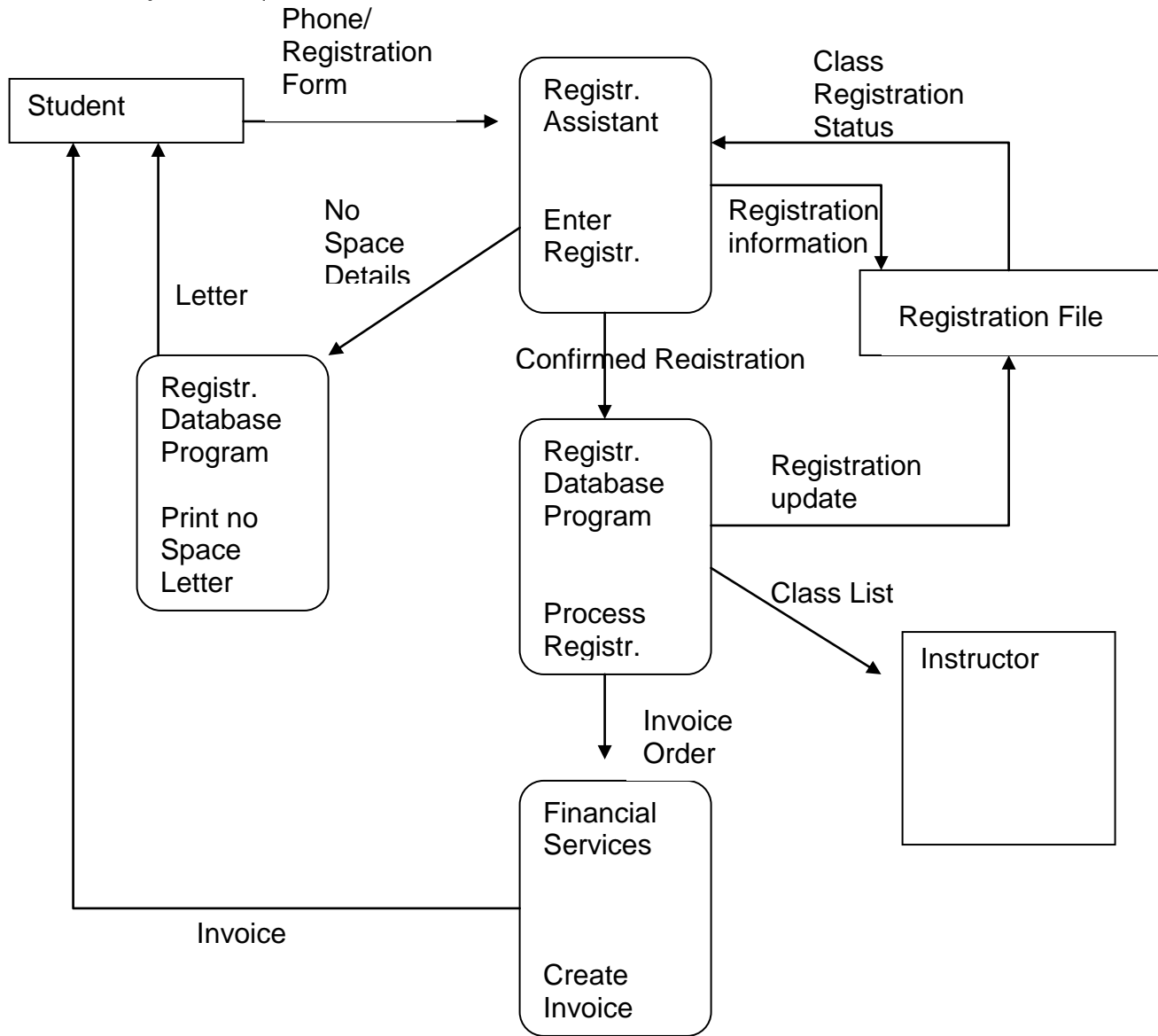


**PART 6 Slide 55****Question 2 (solution)**

a. Pseudocode

```
START
  Open the Equipment Table
  DOWHILE there are more equipment records in the file
    Fetch an equipment record
    IF Rental Price greater than $500
      THEN PRINT Equipment record
    Endif
  ENDDO
STOP
```

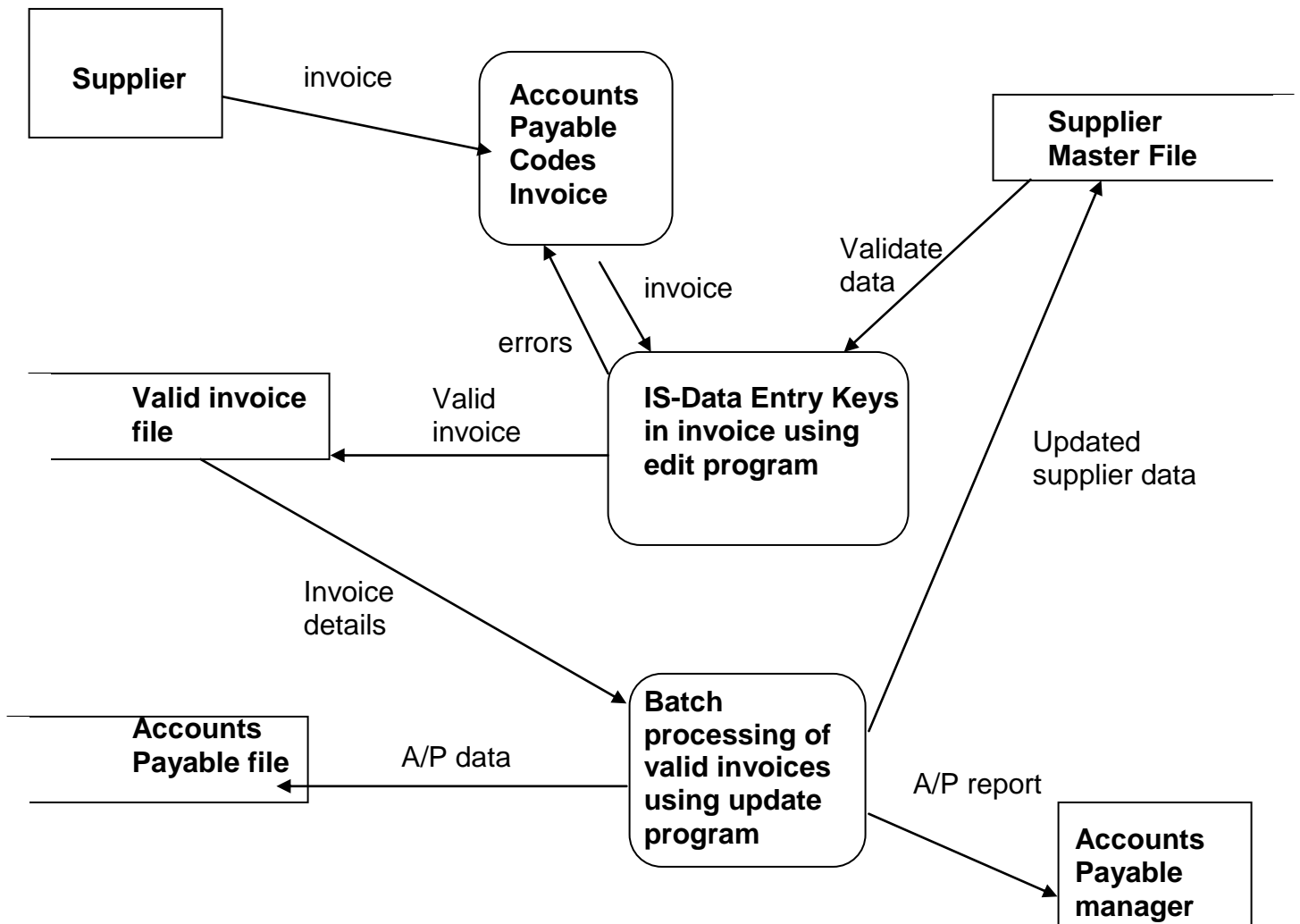
PART 6 Slide 56  
Question 3 (solution)



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## Question 4 (solution)

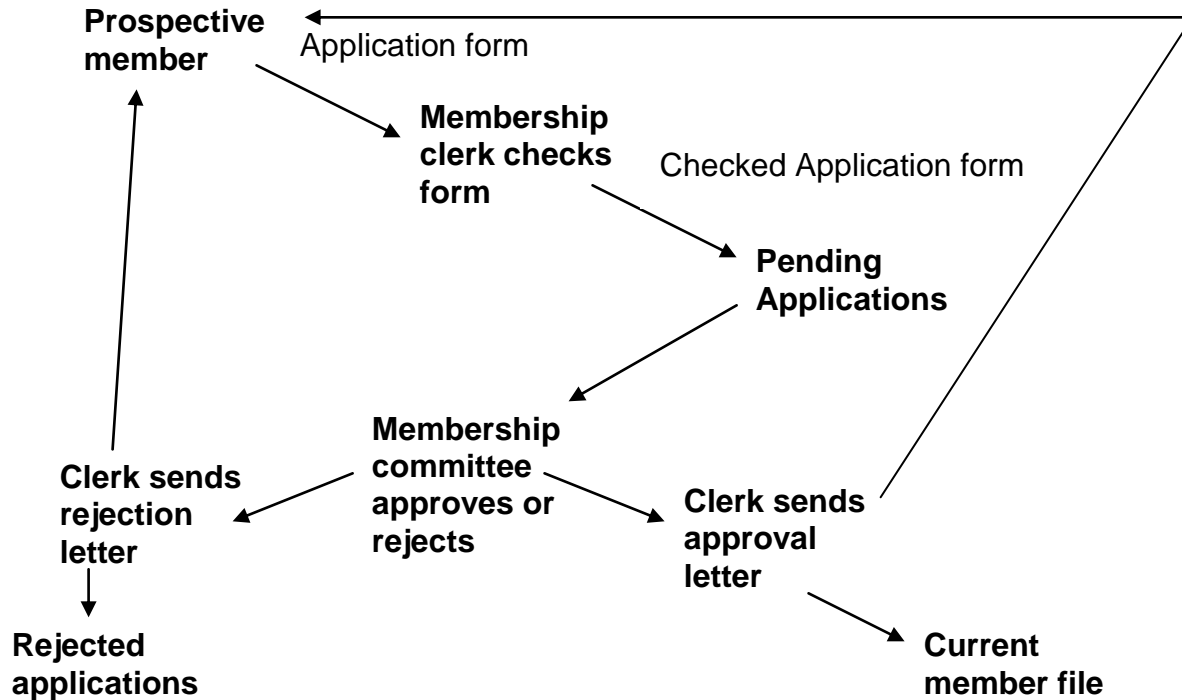
- a. Physical data flow diagrams show how the current procedures or systems are implemented and show actual physical details, while logical data flow diagrams show how data should flow, regardless of the physical implementation (that is, no physical implementation details are shown).
- b. In analyzing the new order entry system, the systems analyst would usually start with a physical DFD that described the current system in detail. The physical DFDs of the current system would then be converted into logical DFDs of the current system to show what the existing system was designed to accomplish. The logical DFDs of the current system would then be modified to incorporate changes for the new system. The new logical DFDs would then be reviewed to ensure the new logical design is complete. Physical DFDs for the new system can be drawn from the new logical DFDs once the physical details have been determined.
- c. I'll start you off with the logic steps and then you can fill in the symbols and details:



## PART 6 Slide 58

## Question 5 (solution)

a. Here's the main part of the flowchart:



3 b. Data dictionary entry for new Member File.

Member consists of:

MEMBER NAME

MEMBER ADDRESS

1 TO 3 lines made up of:

MEMBERSHIP TYPE

MEMBERSHIP FEES

TOTAL FEES BILLED

TOTAL FEES PAID

c. The pseudocode for the report is the following:

START

Open Member file

DOWHILE there are more members in the file

Fetch a member

Subtract Total fees paid from Total fees billed giving unpaid balance

IF update balance is greater than zero

THEN write member record

ENDIF

ENDDO

STOP