SEM 2 2021

PROGRAMMING TECHNIQUES

Lab Exercises

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Chapter: Programming & Problem Solving

This exercise is to expose the students to solve problems by using IPO table, pseudo-code, algorithm and flow chart. Pseudocode is a set of instruction by using human language that understands by human. Algorithm is a set of instruction by using language mimic with the machine language that able to understand by human. Flow chart is a set of instruction using set of symbols; input/output, process, selection/loop and files.

Student is expected to revise their knowledge and skills in Problem Solving course for this exercise on their own.

LAB EXERCISE 1

OBJECTIVES

- Develop an algorithm using flowchart based on the correct format
- Implement step by step problem solving technique
- Simplify the big problem into a small separated problems and solved it one by one

EXERCISE 1.1

You are required to develop a program to calculate a marks percentage and total coursework marks for the subject of Problem Solving. Figure 1 shows an example of how a manual calculation is done.

Student Name: Ahmad Awang

Assessments	***Full Marks***	***Student Marks***	***Marks Percentage***
Quiz 1	2	1	50%
Quiz 2	2	1	50%
Quiz 3	2	0	0%
Quiz 4	4	2	50%
Mid Term Test	15	7	46.7%
Mini Project	25	20	80%
Final Exam	50	40	80%
Total Coursework Marks		***71***	

Figure 1: Manual Calculation for Coursework's Marks

By using a **Sequential Logic Structure** concept, answer the following questions:

a) Construct PAC
b) Construct the Interactivity Chart
c) Construct the IPO table
d) Design the algorithm using
    i) None module
    ii) Module

EXERCISE 1.2

Jati Furniture is a furniture shop selling varieties of furniture made from teak wood. In order to support the green technology initiative, the owner has decided to replace the manual booking system to a computerized system. Your IT Company was trusted to complete the project and as a software engineer, you are responsible to design the system.

Figure 1 shows the manual order form that a clerk have to fill in before it can be send to the production factory. Current practice, for one manual booking form, the clerk is only allowed to key in only three items with the quantity number for each item. Then the clerk have to calculate the quantity total, the total item price and the overall total price. However, for the proposed computerized system, you are required to design a system that can automatically do all the calculation based on the entered inputs by the clerk. Finally the system must be able to produce a report that consist of a Booking ID, booked item, the total item price, the overall total price and the quantity total. Design the computerized system using Sequential Logic structure. Your design must include the following tools:

a) Problem analysis chart (PAC)
b) Interactivity chart
c) IPO chart
d) Algorithm
    i) Without module
    ii) With module
e) Desk checking table for one set of inputs data for algorithm with module

Jati Furniture Booking Form

Booking ID: _____

No.	Item	Price (RM)	Quantity	Total Item Price (RM)
1	Desk	500.00	1	500.00
2	Chair	200.00	2	400.00
3	Bed	1000.00	5	5000.00
			Total	5900.00

LAB EXERCISE 2

OBJECTIVES

- Understand the problem
- Develop an algorithm using flowchart based on the correct format
- Evaluate the solution

EXERCISE 2.1

Write an Algorithm and draw a flowchart to convert the US dollar to Malaysian Ringgit. (Exchange rate for 1 dollar is RM4.10).

EXERCISE 2.2

Write an algorithm and draw a flowchart that will read the diameter of a circle and calculate its area.

EXERCISE 2.3

Ujanailmu is an online business company that sells books in Malaysia. The company has appointed you to develop a ordering system. The System is intended to facilitate the manager to analyse sales record. The information consists of customer id, number of book that have been purchased, the total price of the book and the destination. The books will be delivered by using courier all over Malaysia. For SEMENANJUNG, the company will charge RM2.00 per book and for SABAH/SARAWAK will be charged RM3.00 per book. Write a flowchart that calculates the cost for each customer id.

EXERCISE 2.4

You have been appointed to develop BMI systems that will be used by common person to measure their body index. There are five type of results that will be display based on the BMI result. The five results are show as in table 1.

Table 1 – Five types of result based on BMI

BMI	Type of Result
Underweight	16-18.5
Normal (Healthy weight)	19-29
Obese Class I	30-35
Obese Class II	36-39
Obese Class III	40

Based on the information given, construct the algorithm and flow chart to show how your system works.

LAB EXERCISE 3

OBJECTIVES

- Understand the problem
- Identify the input, process and output by using IPO table and develop an algorithm and flowchart based on the correct format
- Evaluate the solution

EXERCISE 3.1

The systems that will be develop able to read two integer numbers from user. If the first number is bigger than the second number, the program will display the first number as a bigger number. If the second number is bigger than the first number, the program will display the second number as a bigger number. If the value for the integer numbers is same, the program will display "There is no bigger number".

EXERCISE 3.2

Using *for, while* and *do-while* control statement, construct the IPO table, pseudocode and flowcharts that calculate the total number from 1 to 5. One pseudocode and one flowchart for each *for, while* and *do-while* control statement.

EXERCISE 3.3

Construct IPO table, algorithm and draw a flowchart based on the program with switch statement on the following condition:

Case d: print "Display Record"
Case m: print "Modify Record"
Case x: print "Delete Record"
Default: print "INVALID SELECTION!"

Chapter: Introduction to Programming

This exercise will expose students using programming tool to execute a sample program by applying the basic elements (Preprocessor Directives, Header Files, identifiers, reserve word) for a simple program.

LAB EXERCISE 1

OBJECTIVES

- Understand the problem
- Construct the Input Process Output table (IPO)
- Construct the simple code using C

EXERCISE 1.1

Figure 2.1 shows a program to display the age of a student. Execute the program, determine the errors and state the justification of the error occurs. Modify the errors until the program can execute successfully.

```
#include<stdio.h>
main()
{
   const int age=7;
   age=10;
}
```

EXERCISE 1.2

Construct a program using C language to calculate the BMI. Identify the input, process and output using IPO table.

Hints: Three variables involve, BMI, weight in kg and height in meter. The formula is

$$BMI = weight_{kg} / height_{meter} \times height_{meter}$$

EXERCISE 1.3

Construct a program using C language to convert US Dollar into RM. Identify the input, process and output using IPO table.

Hints: 1US dollar = 4 RM

Chapter: Input/ Output Operation

This exercise is intended for students to:

1. apply Input/ Output statement in a program to solve a related problem
2. classify scenario in applying the input/output statement

LAB EXERCISE 1

EXERCISE 1.1

Write simple C code to store in three variables your weight in kilogram (kg), height in centimeter (cm) and shoe size (inch). Draw a flow chart, then define the variables and then assign their values in the body of your program.

EXERCISE 1.2

Write a C program that changes a temperature reading from Fahrenheit to Celcius using the following formula:

Celcius = (100.0 / 180.0) * (Fahrenheit – 32)

Draw a flow chart before construct a program.

EXERCISE 1.3

Write a program to calculate the average score for a student. The class has three hands-on test (30%), two assignments (20%) and a final exam (50%). The maximum score for all test, assignment and exam is 100 points.

Tips:

1. Determine who the end user is.
2. Determine what are input that the user needs to provide.
3. Determine the process of the input.
4. Determine the output from the process.
5. Construct a flow chart and C program.

LAB EXERCISE 2

University of Gambang is a new university established in 2011. Currently, to register new subjects, students have to fill in manually Subjects Registration Form and submit the form to the faculty office as in Figure 1. However, in 2012 the number of students who registered with the University has been dramatically increased. To response with this situation, the University top management have decided to implement fully computerized system for subject's registration. Your company have been chosen to develop the system.

Draw a flow chart and construct the full system in C programming to generate the output for example in Figure 2.

University of Gambang
Subjects Registration Form

Name:
Student ID:
Total Subjects for every semester must be 2

No.	Subject Name	Subject Code	Credit
1			
2			
Total Credits			

Student Signature: Academic Advisor Signature:

```
                    University of Gambang
                  Subjects Registration Form
=====================================================================
Name: Muhammad Fatih
Student ID: CB09100
Total Subjects: 2
---------------------------------------------------------------------
Subject Name                  Subject Code            Credit
---------------------------------------------------------------------
Programming Technique         DCS1053                 3
Current Issues in ICT         DCS1062                 2
---------------------------------------------------------------------
Total Credits:                                        5

Academic Advisor: Rahiwan Nazar
```

LAB EXERCISE 3

The International Competition for Violin and Piano (TICVP) is an annual event. Currently, the TICVP is open for students only. To register, the participant must pay for all items in the Concert Package which includes registration fee, accomodation fee, rehearsals fee and Compact disc (CD) quality video recording of the concert.

The registration fee is USD1200. For accomodation, it costs USD150 per night (minimum one night). Meanwhile, for rehearsals, there are two types namely orchestra rehearsal and piano accompaniment rehearsal. The orchestra rehearsal costs USD420 per hour (minimum 30 minutes) while piano accompaniment rehearsal costs USD120 per hour (minimum 30 minutes). Finally, for CD, the charge is USD150 per piece (minimum 1 piece). The curency rate is USD1 = RM4.07.

Example of output is shown in Figure 3.

```
Number of night: 1
Duration for orchestra rehearsal: 30
Duration for piano rehersal: 30
Number of CD: 1
-----------------------------------
Total in USD: 1770.00
Total in RM: 7203.90
```

Figure 3: Example of the Output

Write a C program to calculate the **total fee** of the Concert Package that needs to be paid by the participant. Then, display the entered input **including the total fee in USD and total fee in RM.** The output must be displayed in **TWO (2)** decimal places. Example of the output is as shown in Figure 3.

Chapter: Operator & Expression

This exercise is intended for students to:

1. apply appropriate operator and expression rules to solve a related problem
2. classify the scenario in applying the arithmetic operator and expression statement

LAB EXERCISE 1

Write an expression to test for each of the following relationships.

1. BMI not bigger than 20
2. Weight is greater than 45 and also lee than 70
3. The value x not more than 19.
4. The value x either equal to g or not less than v.
5. Interest is less than 12 and also greater than 7

LAB EXERCISE 2

Tasks:

Construct a flowchart for the following problem:

Write a program to calculate the parking fare for customers who park their vehicles in a parking lot. This is a public lot. To encourage people to park for a short period of time, the management uses two different rates for each type of vehicle, as shown in Table 1.

Table 1: Parking Rates

Vehicle	*First Rate (<=3Hour)*	*Second Rate*
CAR	RM0.00 first 3 hr	RM1.50/hr after 3 hr
TRUCK	RM1.00 first 3 hr	RM2.30/hr after 3 hr
BUS	RM2.00 first 3 hr	RM3.70/hr after 3 hr

No vehicle is allowed to stay in the parking lot later than midnight; it will be towed away.

The input data consists of a character and a set of four integers representing the type of vehicle and the entering and leaving hours. But these pieces of data must be input into the computer in a user-friendly way. In other words, the computer must prompt the user to enter each piece of data as shown below. (Color indicates typical data)

```
Type of vehicle? C
Hour vehicle entered lot (0-24)? 14
Hour vehicle left lot    (0-24)? 18
```

The output format is shown below.

```
                    PARKING LOT CHARGE

Type of vehicle: Car or Bus or Truck
TIME-IN              XX
TIME-OUT             XX
                     -----------
PARKING TIME         XX
                     -----------
TOTAL CHARGE   RM    XX.XX
```

Your program should provide the following information:

a. A character showing the type of vehicle: C for car, B for bus, T for truck.
b. An integer between 0 and 24 showing the hour the vehicle entered the lot.
c. An integer between 0 and 24 showing the hour the vehicle left the lot.

LAB EXERCISE 3

Tasks:

Construct a flowchart for the following problem:

Write a program to calculate the parking fare for customers who park their vehicles in a parking lot. This is a public lot. To encourage people to park for a short period of time, the management uses two different rates for each type of vehicle, as shown in Table 1.

Vehicle	*First Rate*	*Second Rate*
CAR	RM0.00 first 3 hr	RM1.50/hr after 3 hr
TRUCK	RM1.00 first 2 hr	RM2.30/hr after 2 hr
BUS	RM2.00 for first hr	RM3.70/hr after first hr

Table 1: Parking Rates

No vehicle is allowed to stay in the parking lot later than midnight; it will be towed away.

The input data consists of a character and a set of four integers representing the type of vehicle and the entering and leaving hours and minutes. But these pieces of data must be input into the computer in a user-friendly way. In other words, the computer must prompt the user to enter each piece of data as shown below. (Color indicates typical data)

```
Type of vehicle? C
Hour vehicle entered lot      (0-24)? 14
Minute vehicle entered lot    (0-60)? 23
Hour vehicle left lot         (0-24)? 18
Minute vehicle left lot       (0-60)? 8
```

The output format is shown below.

```
                    PARKING LOT CHARGE

Type of vehicle: Car or Bus or Truck
TIME-IN              XX : XX
TIME-OUT             XX : XX
                     -----------
PARKING TIME         XX : XX
ROUNDED TOTAL             XX
                     -----------
TOTAL CHARGE         RM XX.XX
```

Since there are no fractional hour charges, the program must also round the parking time up to the next hour before calculating the charge. The program should use the *switch* statement to distinguish between the different types of vehicles

Your program should provide the following information::

a. A character showing the type of vehicle: C for car, B for bus, T for truck.
b. An integer between 0 and 24 showing the hour the vehicle entered the lot.
c. An integer between 0 and 60 showing the minute the vehicle entered the lot.
d. An integer between 0 and 24 showing the hour the vehicle left the lot.
e. An integer between 0 and 60 showing the minute the vehicle left the lot.

.

Chapter: Control Statements

This exercise is intended for students to:

1. apply appropriate control statement to solve a related problem
2. classify the scenario in applying the control statement

LAB EXERCISE 1

OBJECTIVES

- Understand the concept of control statement – if else, for, while, do-while and switch-case
- Develop an algorithm using flowchart based on the correct format
- Implement step by step problem solving technique
- Construct a C program based on the flowchart.

Tasks:

Construct a C program based on the constructed flowchart in **Chapter Programming & Problem Solving, Lab Exercise 2.3**. Below are the steps in constructing the program.

Steps:

1. Determine the appropriate variables needed.
2. Declare the determined variables.
3. Code the program based on flow in the flowchart

LAB EXERCISE 2

OBJECTIVES

- Understand the concept of control statement – if else, for, while, do-while and switch-case
- Develop an algorithm using flowchart based on the correct format
- Implement step by step problem solving technique
- Construct a C program based on the flowchart.

Tasks:

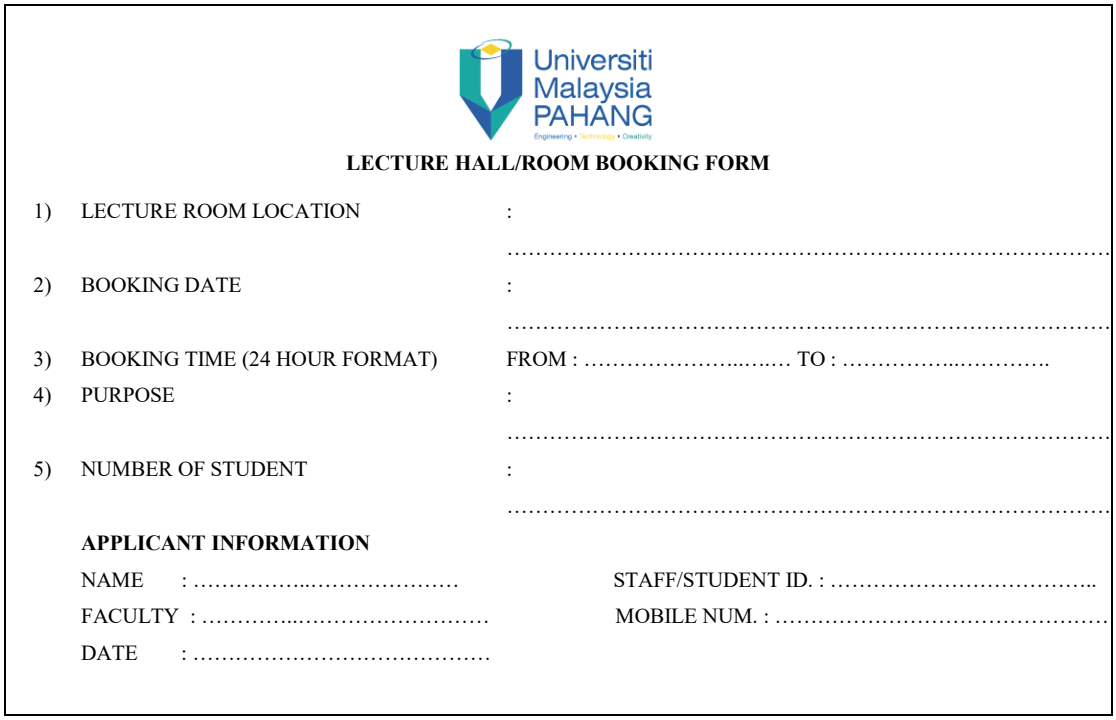
QUESTION:

Figure 1 shows the Lecture Hall/Room booking form for Faculty of Computer System & Software Engineering (FSKKP).In supporting government initiative to reduce paper usage, FSKKP had decided to replace the manual application form to a computerized system. Your IT company is trusted to complete the project and as a programmer, you have been given responsible to develop the system.

Construct a flow chart and a program for FSKKP Lecture Hall/Room booking system using C programming language. The system must be able to generate a booking report, and the **output format** must follow exactly the example as shown in Figure 2.

Steps:

1. Ask user to enter all required information as in the form below.
2. TOTAL BOOKING TIME is obtained from the BOOKING TIME FROM and TO.
3. There are 2 types of lecture room, which is lecture hall and lecture room. Maximum number of student for lecture hall is 100 and 50 for lecture room. Lecture hall is from YDK1 to YDK5 and lecture room is from XBK1 to XBK10. ***If user enter total number of student more than 50, your system will display the option of lecture hall (YDK1 to YDK5). If total number of student is less than or equal to 50, display the option of lecture room (XBK1 to XBK10).***



LECTURE HALL/ROOM BOOKING FORM

1) LECTURE ROOM LOCATION :

……

2) BOOKING DATE :

……

3) BOOKING TIME (24 HOUR FORMAT) FROM : ……..…. TO : ……..…….

4) PURPOSE :

……

5) NUMBER OF STUDENT :

……

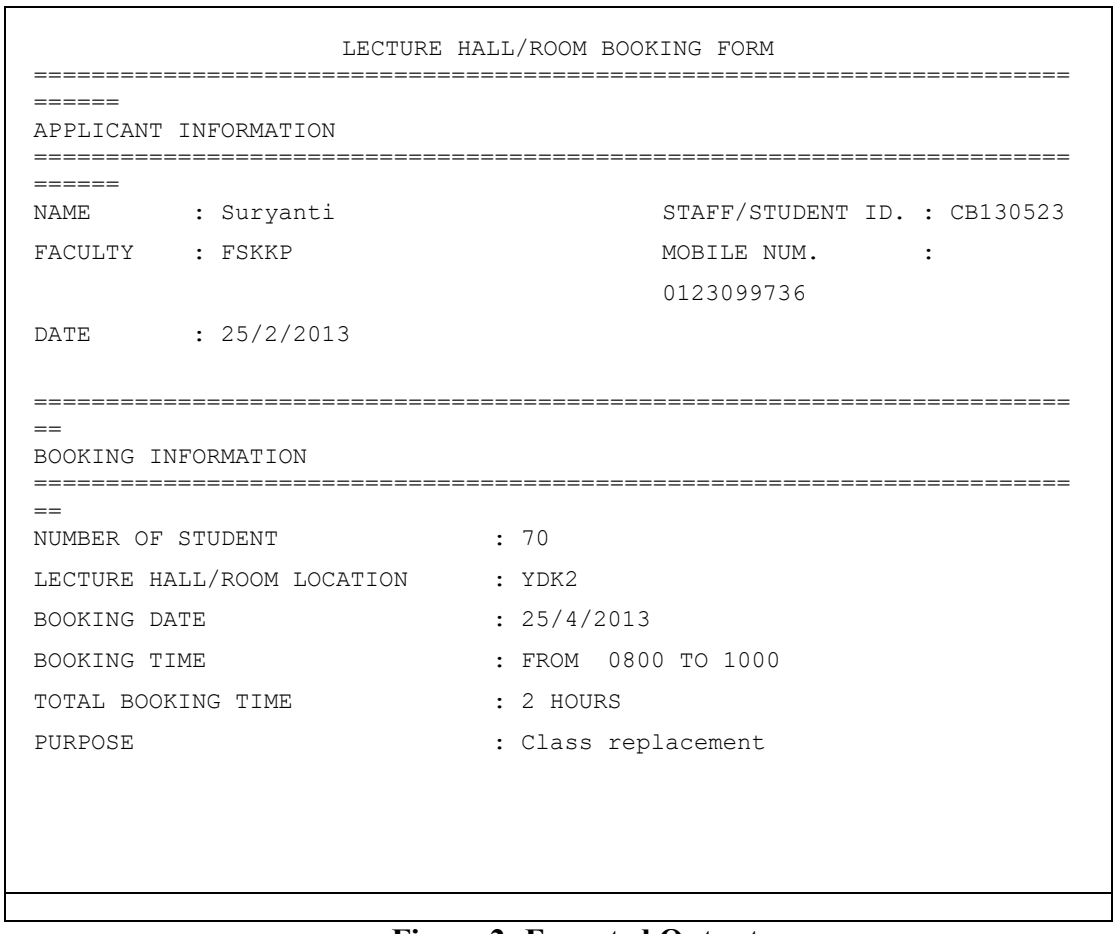
APPLICANT INFORMATION

NAME : ……..…… STAFF/STUDENT ID. : ……..

FACULTY : ……..…… MOBILE NUM. : ……

DATE : ……

Figure 1: Lab Booking Form



```
                    LECTURE HALL/ROOM BOOKING FORM
========================================================================
======
APPLICANT INFORMATION
========================================================================
======
NAME        : Suryanti                    STAFF/STUDENT ID.  : CB130523
FACULTY     : FSKKP                       MOBILE NUM.        :
                                          0123099736
DATE        : 25/2/2013

========================================================================
==
BOOKING INFORMATION
========================================================================
==
NUMBER OF STUDENT              : 70
LECTURE HALL/ROOM LOCATION     : YDK2
BOOKING DATE                   : 25/4/2013
BOOKING TIME                   : FROM  0800 TO 1000
TOTAL BOOKING TIME             : 2 HOURS
PURPOSE                        : Class replacement
```

Figure 2: Expected Output

LAB EXERCISE 3

OBJECTIVES

- Understand the concept of control statement – if else, for, while, do-while and switch-case
- Develop an algorithm using flowchart based on the correct format
- Implement step by step problem solving technique
- Construct a C program based on the flowchart.

Tasks:

Plus Expressway Berhad Holding is a company that manage all Plus Highways in Malaysia. In order to avoid traffic congestion, highway users are required to prepare a sufficient amount of money. However, the problem is user always forget or don't know the amount of fare they have to pay at the exit toll. To overcome this problem, you are required to develop a system for highway users that calculate the exact amount of fare users have to pay at the exit toll. As a starting point you have to design a calculator only for users who travel between Johor Bahru and Kuala Lumpur. In order to help you design the system, the following information is given:

a) An integer showing the **type of vehicle**: **Car=1, Bus=2, Truck/Lorry=3**.

b) Different rates for each type of vehicle as shown in Figure 1.

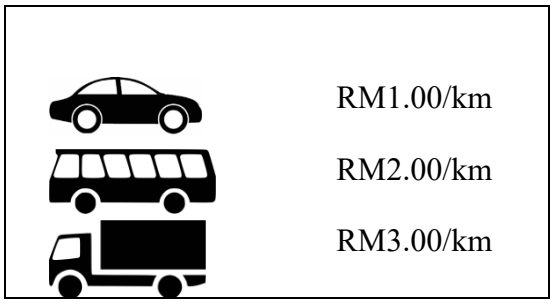


Figure 1: Toll Rate per Kilometer based on the vehicle type

c) An integer showing **toll plaza** location: **Johor Bahru =1, Muar=2, Melaka =3, Kuala Lumpur=4.**

d) The distance based on different entering toll location as shown in Figure 2.

e) The journey is from JB to north only (ex: from JB to Muar)

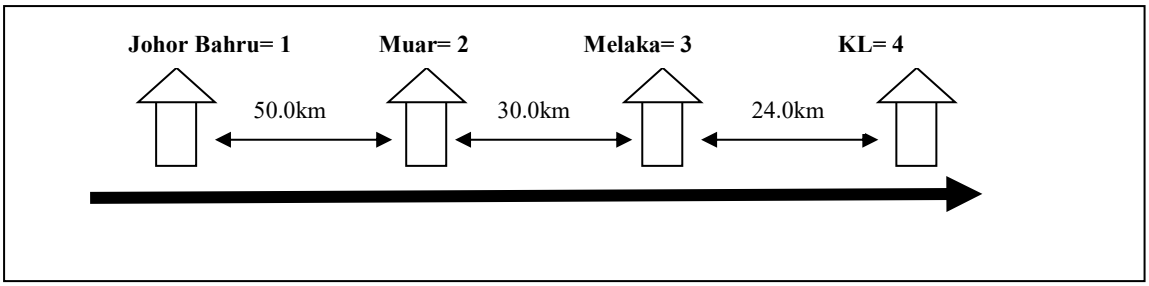


Figure 2: Distance based on entry toll.

The input data consists of integers representing the type of vehicle and entry toll plaza. But these pieces of data must be input into the computer in a **user-friendly** way. In other words, the computer must prompt the user to enter each piece of data as shown in the example in Figure 3.

```
Type of vehicle?(Car=1,Bus=2,Lorry=3): 2
Exit toll plaza?(Muar=2,Melaka=3,KL=4): 2
```

Figure 3: Example of User Input Interface

User must be able to enter the input and obtained the output as shown by example in Figure 4.

```
Thank you for using Plus Highway Fare Calculator
Type of vehicle? (Car=1,Bus=2,Lorry=3): 2
Exit toll plaza? (Muar=2,Melaka=3,KL=4): 2

Type of vehicle:        bus
Distance:               50.0km
Fare Charge:            RM100.00

Exit? (0 for yes/1 for no): 1

Type of vehicle? (Car=1,Bus=2,Lorry=3):1
Exit toll plaza? (Muar=2,Melaka=3,KL=4):4
Type of vehicle:        car
Distance:               104.0km
Fare Charge:            RM104.00
Exit? (0 for yes/1 for no): 0
BYE!!
Have a save journey!!
```

Figure 4: Example of program output

Chapter: Arrays

This exercise is intended for students to:

1. apply one-dimension arrays techniques to solve a related problem
2. classify the scenario in applying the one-dimension array

LAB EXERCISE 1

Tasks:

UMP wants to improvise the manual subject registration to an automated system. Figure 1 shows the manual form that student needs to fill in. In normal practice, student can register up to 18 total credits in one semester. Your task is to develop a program that allow student to do the subject registration through online. Please construct a flow chart first and code the program based on the flow chart and apply function elements in the program.

Tips:

1. Who is the end user?
2. Use array for subject code, subject name and subject credit to help you in storing the information from the user.
3. Ask user to enter how many subject to be registered. (this will help you to know how many size of array)
4. Define the next processes:……..
5. Print out the output, for example in Figure 2.

Universiti Malaysia PAHANG

SUBJECT REGISTRATION FORM

1) STUDENT NAME : ……

2) STUDENT ID : ……

3) SEMESTER : ……..…..

4) ACADEMIC ADVISOR : ……

4)

SUBJECT CODE	SUBJECT NAME	SUBJECT CREDIT
	TOTAL CREDIT:	

Figure 1: Manual Subject Registration Form

```
                        University of Gambang
                     Subjects Registration Form
       ============================================================
                        University of Gambang
                     Subjects Registration Form
    ================================================================
Name: Muhammad Fatih
Student ID: CB09100
Total Subjects: 5
-----------------------------------------------------------------
Subject Name              Subject Code        Credit
-----------------------------------------------------------------
Programming Technique           DCS1053                  3
Current Issues in ICT           DCS1062                  3
Object Oriented Programming     DCS1083                  3
Web Programming                 DCS3023                  3
Mathematics                     DUM2043                  3
-----------------------------------------------------------------
Total Credits:                                           15

Academic Advisor: Rahiwan Nazar
```

Figure 2: Expected final output

LAB EXERCISE 2

Tasks:

In order to support the government initiative to reduce the use of paper in daily operation, Universiti Malaysia Pahang took a step forward in converting all manual systems to be computerized. One of the manual systems that currently been used is electrical appliance registration. Figure 1 show the manual form students had to fill in before it can be processed by college administrator. Develop a computerized system for UMP Electrical Appliance Registration System using **C Programming**.

For **1 semester**, student can **register up to 3** electrical appliances. If they want to apply more than that, system will trigger a message **"Only 3 electrical appliances are allowed in 1 semester"**. Fee for the electrical appliance are as follows:

a. **Rice Cooker – RM7.00**

b. **Radio – RM3.00**

c. **Iron – RM5.00**

d. **Charger – RM2.00**

e. **Kettle – RM3.00**

If student enter other than listed electrical appliance, trigger a message that **"The electrical appliance is not allowed in the hostel room"**.
By using array or any related statement, your output must follow a format as in expected output depicted in Figure 2.

UMP Electrical Appliance Registration Form

Name : _____

Student ID :_____

Room :_____

No	Item	Fee (RM)
Total		

Figure 1: Manual UMP Electrical Appliance Registration Form

Tips:

1. Who is the end user? ……..
2. Use array to store information about electrical appliance.
3. Define the next processes:……..
4. Print out the output, for example in Figure 2.
5. Organize the processes using functions.

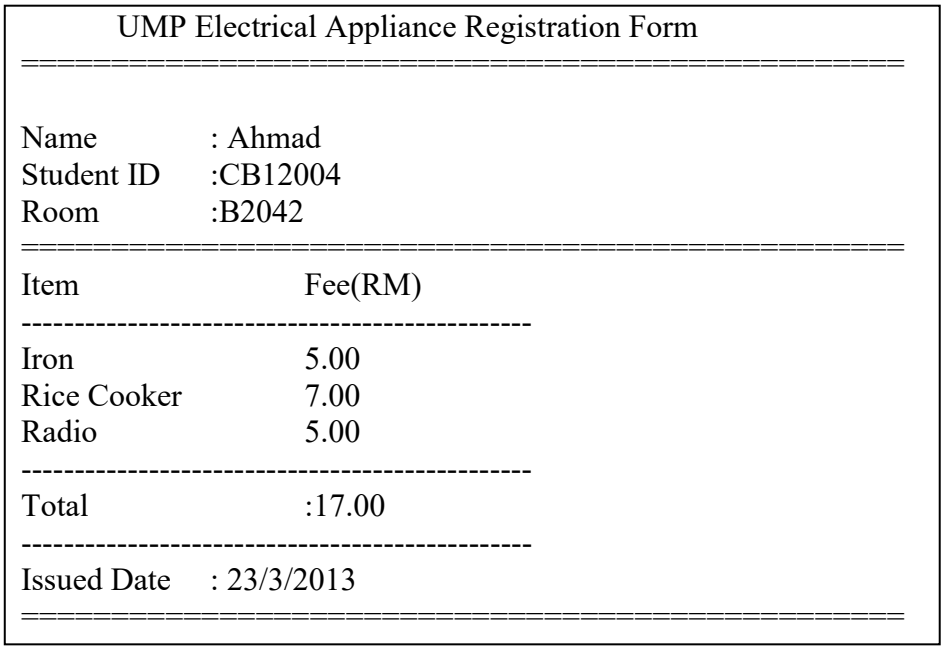


Figure 2: Expected Output

Chapter: Functions

This exercise is intended for students to:

1. explain the usage the function's element in a sample of program
2. apply function approach to solve a related problem
3. classify the scenario in applying the function approach

LAB EXERCISE 1

Tasks:

YourStore Sdn. Bhd. is an advertisement company that offers customers a storage box in their shop to promote or display as well as to sell customer's product. In order to help the customers, book the storage box and to give related information, online registration will be develop. As a system developer, you are assigned to develop the system. The system should provide information about the type of storage box which are:

a. Small box (50cm x 50cm): able to display a maximum of 5 items and fee is RM5 per week.
b. Regular box (100cm x 100cm): able to display a maximum of 8 items and fee is RM15 per week.
c. Large box (200cm x 200cm): able to display a maximum of 12 items and fee is RM 25 per week.

The output of the system could be as in Figure 1.

```
================================================================================
                          YourStore Sdn. Bhd.
================================================================================

Storage Size:
[1] Small Box (50cm x 50cm)-RM5 per week
[2] Regular Box (100cm x 100cm)- RM15 per week
[3] Large Box (200cm x 200cm)- RM25 per week
Please choose your storage:1


You have selected Small Box. How many items to display? (up to 5 items):2
Item 1:Comic
Price:RM80
Item 2:Pewter
Price:RM150
How many weeks to display the items?:2


You have entered 2 items to be displayed in your storage.


---------------------------------
Item            Price
---------------------------------
Comic           RM80.00
Pewter          RM150.00
---------------------------------

Your fees for 2 weeks is:RM10.00
```

Figure 1: Example of the system's output

Answer the following questions based on the description.

a) Write a flowchart to represent the process flow of the system.
b) Construct a complete program to translate your flowchart in (a) by applying function technique.

LAB EXERCISE 2

Tasks:

Develop an online shopping management system for LXM company. Below is the list of items that is available in LXM company. In your system, target user is a staff of the company that responsible to handle customer needs. Every sales will be charged with GST at 6%. The sales with RM100-RM200 will get 10% discount, RM201-RM300 will get 20% discount and sales with more than RM301 will get 30% discount. The screen output for the staff is as in figure 1. Total sale is the total of sales from all the customers.

Table 1: Item in store

Item	Code	price
T-Shirt A	B001	50.90
T-Shirt B	B002	30.90
T-Shirt C	B003	45.90
Blouse A	N001	50.55
Blouse B	N002	45.90
Blouse C	N003	35.60
Jeans A	D001	11.50
Jeans B	D002	16.50
Jeans C	D003	12.00

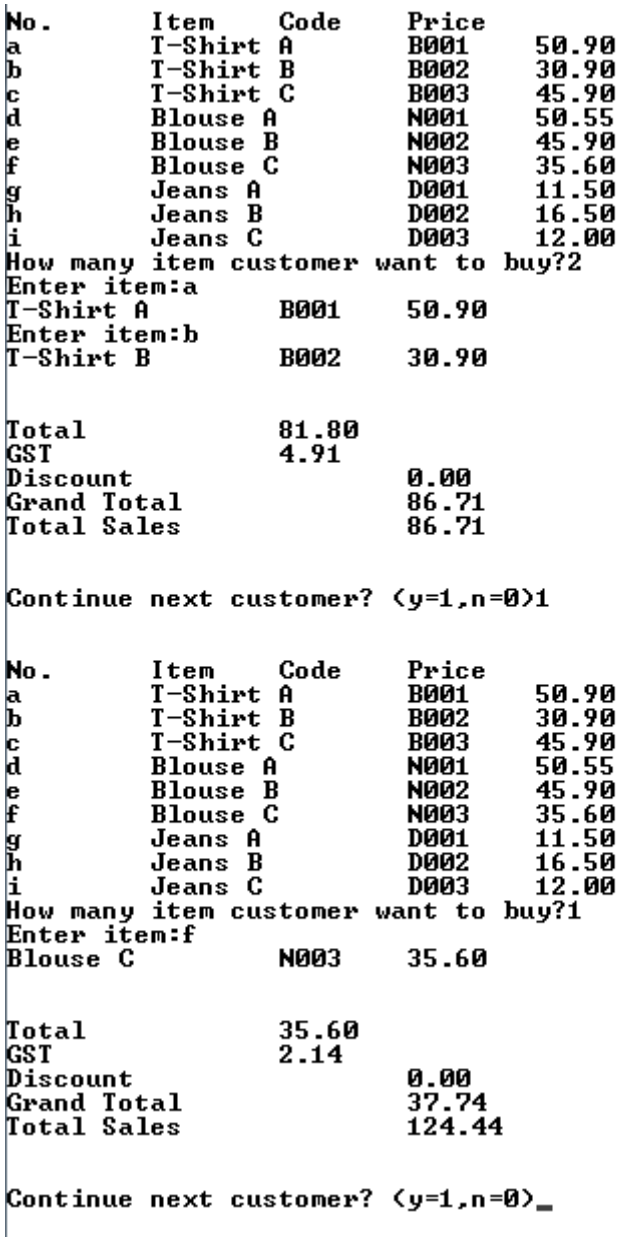


Figure1: The screen output for the staff

LAB EXERCISE 3

Tasks:[

Draw a flow chart and construct a programming for the following case study. You are given a fast food restaurant (Marry Brown). This restaurant offers a list of foods, drinks and other related items. This information (menu) should be presented in a menu. Then, a customer (ONE(1)) can **make an order** and **finally get the total price of the ordering items**. The order may consist of several items and volumes from the menu. You may add any additional element such as discount, taxes etc.

i. **Restaurant** – student must get the actual menu from the restaurant with the price.
ii. **Use any appropriate looping type** in the program.

LAB EXERCISE 4

Tasks:

Draw a flow chart and construct a programming that consists of functions for the following case study.

PTPTN has launched three new study loan schemes to all university students in Malaysia. For the purpose of application, the applicant needs to provide the personnel information, which is name, university, current parents' monthly income and duration of study (in year).

PTPTN provides a formula to process the application and calculate the amount of loan that will be given to the successful applicant and also calculate the expected payback rate per month on completion of study. Table 1 shows the detail of each scheme. Finally PTPTN will produce a letter to the successful applicant that contains personal information, total amount of loan and expected payback rate. The example of an expected output as shown in Figure 1.

Table 1: Scheme for PTPTN Loan

Scheme	**current parents monthly income**	**Formula to calculate the amount of loan and the expected payback rate per month**
Mesra	less than RM3500	Tuition Fee = RM6000 x Duration of Study Daily Expenses = RM20 * 300 * Duration of Study Service Charge = 1% x (Tuition Fee + Daily Expenses) **Amount of Loan** = Tuition Fee + Daily Expenses + Service Charge **Payback Rate** = Amount of loan / (Duration of study * 12 * 4)
Jimat	between RM3500 and RM5500	Tuition Fee = RM6000 x Duration of Study Daily Expenses = RM10 * 300 * Duration of Study Service Charge = 1% x (Tuition Fee + Daily Expenses) **Amount of Loan** = Tuition Fee + Daily Expenses + Service Charge **Payback Rate** = Amount of Loan / (Duration of Study * 12 * 3)
Selesa	monthly income greater than RM5500	Tuition Fee = RM6000 x Duration of Study Service Charge = 1% x Tuition Fee **Amount of Loan** = Tuition Fee + Service Charge **Payback Rate** = Amount of Loan / (Duration of Study * 12 * 2)

```
                    PTPTN Loan Scheme
   A. Personnel Info
   B. Loan Scheme
   C. Total Loan and Payback Rate
   D. Output

Please key in your personnel info.
A
Personnel Info

Name: Muhammad Bin Salim
Universiti: Universiti Malaysia Pahang
Parents' monthly income: RM5000
Duration of study: 4

--------------------------------
Enter your next menu: B
.
```

Figure 1: Example of the expected output

Chapter: File Operation

This exercise is intended for students to:

1. apply file processing techniques to solve a related problem
2. classify the scenario in applying the file processing technique

LAB EXERCISE 1

Tasks:

T-Shirt4U is an online business company that sells muslimah t-shirt in Malaysia. The company has appointed you to develop a sale analysis system. System is intended to facilitate the manager to analyze sales record. The sales record in given to you with the information as shown in the input file named **sales.txt** as in Figure 1. The price of the muslimah t-shirt is RM50.00/piece.

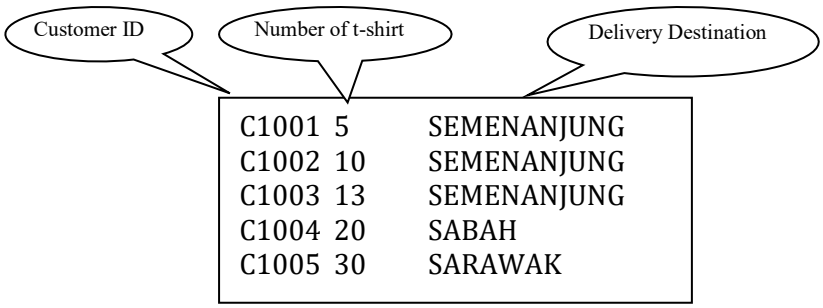


Figure 1: sales.txt file

The company will give 5% discount if the customer buys more than 5 pieces, 10% discount for more than 10 pieces, 20% discount for more than 15 pieces and 30% for more than 20 pieces.

The t-shirts will be delivered by using courier all over Malaysia. For SEMENANJUNG, the company will charge RM3.00 per piece and for SABAH/SARAWAK will be charged RM8.00 per piece.

After all the process, the system will print out the processed information in an output file. Figure 2 is the example of output file with the processed information.

SALES RECORD

Customer_ID	T-Shirt	Discount	Total_Price	Destination	Postage_Fare	Total_Fare
C1001	5	0.00	250.00	SEMENANJUNG	15.00	265.00
C1002	10	25.00	475.00	SEMENANJUNG	30.00	505.00
C1003	13	65.00	585.00	SEMENANJUNG	39.00	624.00
C1004	20	200.00	800.00	SABAH	160.00	960.00
C1005	30	450.00	1050.00	SARAWAK	240.00	1290.00

Total Sales: 3644.00

Figure 2: salestatistic.txt file

Your system would have a few functions such as **main**, **calculate_discount, calculate_postage** and etc**.**

a. Based on the problems and user requirement given construct a flowchart or pseudocode to indicate the flow of sale analysis system.
b. Translate the flowchart or pseudocode into full free error coding.

Hints: functions, 2-D Array, File.

LAB EXERCISE 2

Tasks:

Airspeed Airline is a domestic airline company. Airspeed has appointed you to develop a sale analysis system. System is intended to facilitate the manager to analyze the sales record. You are given an input file named **sale.txt** that consists of the following information as in Figure 1.

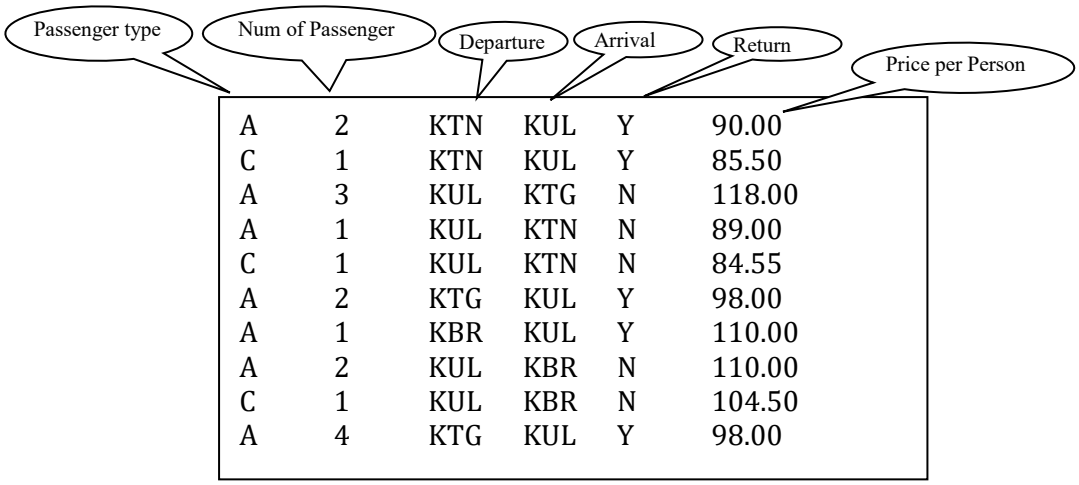


Figure 3: sale.txt file

Your system should allow the following functions with the following processes:

1. In main function:
    a. Read the information line by line (in array).
    b. Call function total fare to get total fare for each line. You must pass the value of return and price per person to the total fare function in order to calculate the total fare.
    c. After you get all the total fare from the total fare function, the output will be written **in the output file as shown in Figure 2.**
2. In total fare function:
    a. This function will calculate **the discount of 5% if return in Y**.
    b. Total fare will be calculated based on **price after discount x number of passenger**.
    c. The value of price after discount and total fare will be returned to the main function.

SALES RECORD

Passenger_Type	Bil	Price/person	Return	Price After Discount	Total_Fare
A	2	90.00	Y	85.50	171.00
C	1	85.50	Y	81.23	81.23
A	3	118.00	N	118.00	354.00
A	1	89.00	N	89.00	89.00
C	1	84.55	N	84.55	84.55
A	2	98.00	Y	93.10	196.00
A	1	110.00	Y	104.50	104.50
A	2	110.00	N	110.00	220.00
C	1	104.50	N	104.50	104.50
A	4	98.00	Y	93.10	372.40

Total Sales:1776.68

Figure 4: salestatistic.txt file

Your system would have a few functions such as **main** and **total_fare.**

c. Based on the problems and user requirement given construct a flowchart or pseudocode to indicate the flow of sale analysis system.
d. Translate the flowchart or pseudocode into full free error coding.

Hints: functions (main, read_price, calculate_discount, total_fare), 2-D Array, File.

Additional materials

The objective of this section is to prepare students for assessments such as hands on test and final exam.

LAB EXERCISE 1

Tasks:

As a new coach of the National's football team, Mr X is needed to know the latest leader in Liga Super Championship. All of the games result is represented in text file (result.txt) that consist of Team Name, Games Played, Wins, Draw and Lose as formatted in Figure 1. Full list of the text file is attached in Figure 3.

```
ATM
22
10
4
8
```

Figure 1: Portion of text file named result.txt.

Points will be given based on the number of wins and draw with a 3 point for win, and 1 point for draw. Then, determine the winning team of the Liga Super Championship. The winner will be selected based on highest total points collected by each teams. Then, record the games result for that particular team in a new text files (winner.txt) to be given to the Mr. X as formatted in Figure 2.

```
Liga Super Championship!
------------------------------
Winner          :ATM
Wins            :10
Draw            :4
Lose            :8
Points          :34
```

Figure 2: Text file named winner.txt.

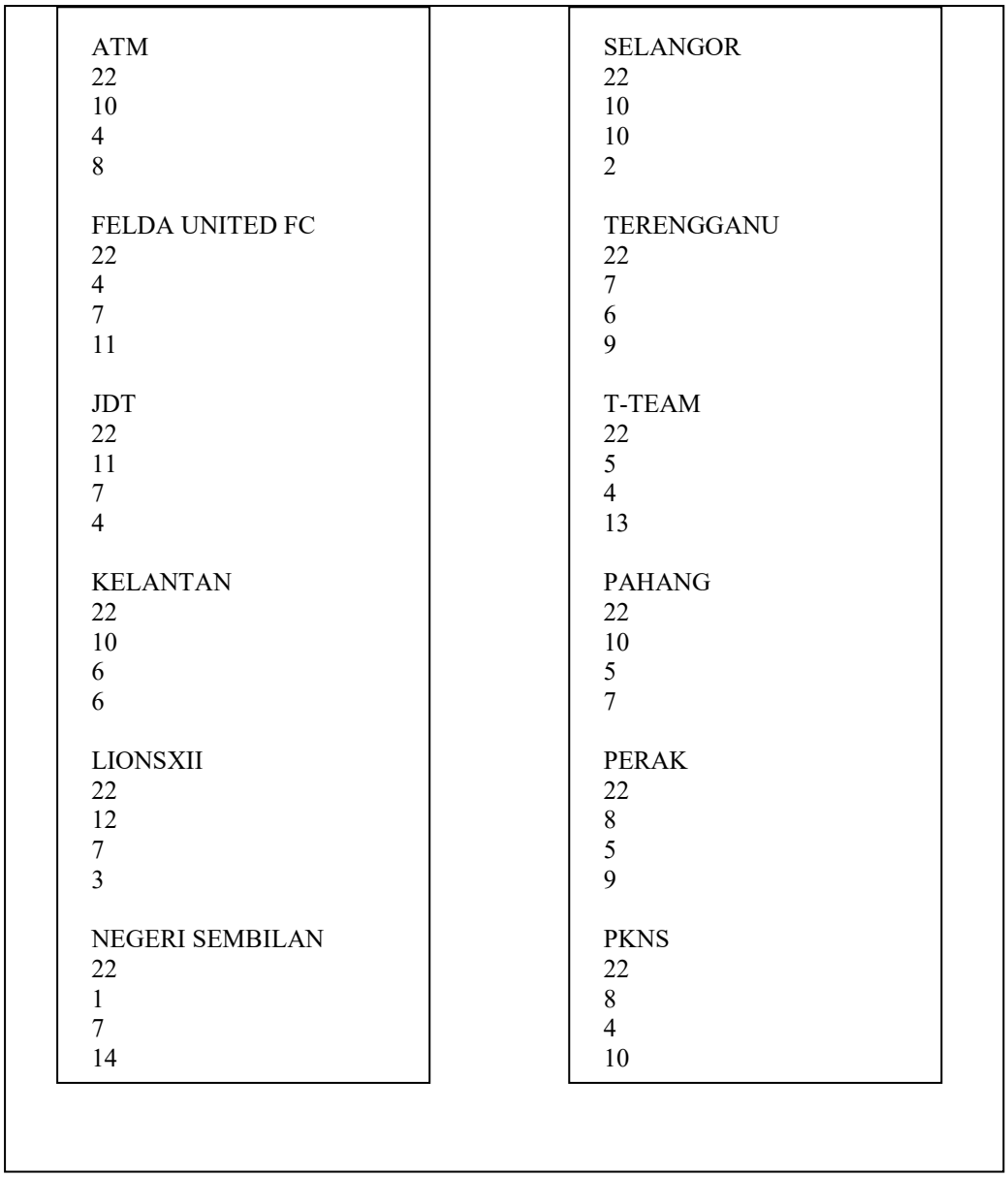


Figure 3: Text file named result.txt.

Answer the following questions based on the description.

a) Write an algorithm to represent the process flow of the system

b) Construct a complete program to translate your flowchart in (a) that consist of the task to read a data file, determine the winner of the championship by calculating the points, and record the winner information into a new text file.

LAB EXERCISE 2

Tasks:

You have been appointed to develop the graduation system for UMP. The purpose of the system is to identify the degree classification for each student .The system is able to achieve and process information for a file named studentresult.txt. The file contains student information and GPA results of each semester as shown in Figure 1.

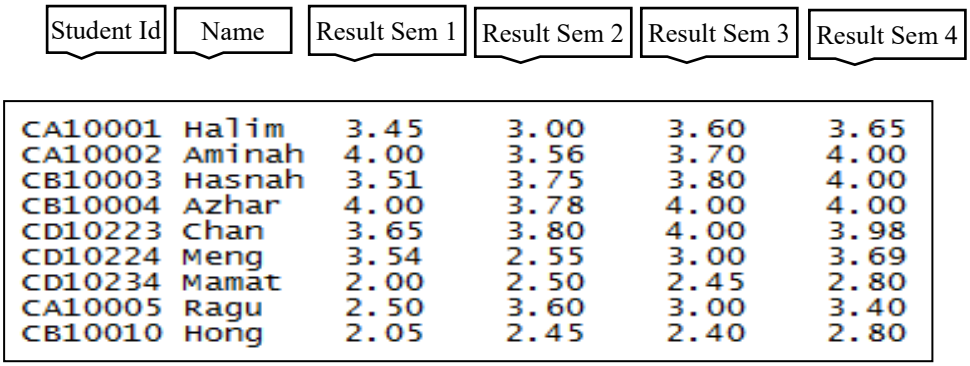


Figure 5: The information in studentresult.txt file

The results that have been recorded are for four semesters and the total credits registered by the students for each semester are 15, 17, 19 and 15, respectively. To determine the degree classification for each student, you need to calculate their CPA. The formula to calculate total grade value for each semester and CPA is shown in Formula 1 and Formula 2 respectively.

Formula 1:

total_grade_value_per_semester = GPA_per_semester * credit_per_semester

Formula 2:

CPA = overall_total_grade/ Overall_total_credit

***overall_total_grade = total_grade_value_sem_1+ … + total_grade_value_sem_x*

overall_total_credit = credit_sem_1 + … + credit_sem_x

There are four degree classifications that need to be considered: First Class, Second Class Upper, Second Class Lower and Third Class. The condition to determine degree classification is listed in Table 1.

Table 2: Condition for each degree classification

Class Degree Type	Condition
First Class	CPA>=3.67
Second Class Upper	3.00<=CPA<3.67
Second Class Lower	2.33<=CPA<3.00
Third Class	2.00<=CPA<2.33

After degree classification has been determined for each student, the information such as student ID, CPA and class degree should be stored in classresult.txt file as shown in Figure 2. Then, the system will display the student list with their degree classification on the user screen as shown in Figure 3.

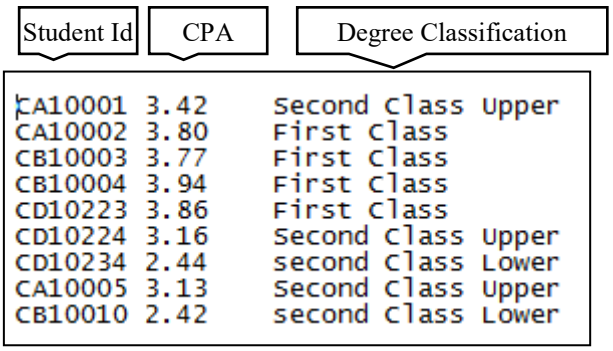


Figure 6: The information in classresult.txt file

Figure 7: The output in the user screen

Tips:

a) Understand the case study and construct the flowchart for the system.

b) Write the program based on flowchart in (a) by applying modular programming, file processing and other related techniques when necessary. Figure 4 is the guideline of program.

```
            .. //File buffer
            .. //Functions identifier
            .. //Global variable
            main()
            {  read_file(); //call functions
               cal_CGPA();
               save_file();
            }
            int read_file()//Read file to process
            {  .. //open file
               .. //read student result in the file
               .. //close file
            }
            float cal_CGPA()//Calculate CGPA
            {
               ... //calculate CGPA }

            char save_file()//Save result into file
            {
               .. //open file

               .. //write the result in the file

               .. //close file
}
```

Figure 4: Program guideline