LAB OBJECTIVES

At the end of this lab activity, the students should be able to:

- Use **selection** control structures; **if, if…else,** and **switch case** statements to select between few alternatives.
- Use **repetition** control structures ; **for, while,** and **do..while** statements to iterate processes or to repeat statements.
- Apply arithmetic, relational and logical operators in C programs.
- Use **strcpy()** built-in function to copy strings.

PRACTICE

SELECTION CONTROL STRUCTURES

1. Write complete C program to do the required tasks based on the choice made by the user.

- Get choice from the user.
- Based on their choice, identify the task to be done. Use the table below as your reference.

Choice	Task
1	• Ask the user to enter distance and time. • Calculate and display the speed. *speed = distance ÷ time*
2	• Ask the user to enter mass and height. • Calculate and display the work done *work = mass x gravity x height* • Gravity is 9.8. Set it as constant using **const** keyword.
3	• Ask the user to enter value in radian. • Calculate and display he degree. degree = radian x 57.2958
Other values	Display “You have entered an invalid code. Program will terminate.”

- Display the information as shown below.

```
------------------------------
  1. Calculate Speed
  2. Calculate Work
  3. Convert radian to degree
------------------------------
Enter your choice : 2

Enter mass (kg) : 45
Enter height (m): 19
Work is 8379.00 Joules
```

```
----------------------------------------
  1. Calculate Speed
  2. Calculate Work
  3. Convert radian to degree
----------------------------------------
Enter your choice : 3

Enter radian : 5
5.00 radian is equals to 286.48 degree
```

2. Create a complete C program for a laundry operation.

- Get the laundry weight from the user and whether he/she needs ironing.
- Identify the rate based on the table below. Use **if else** statement.

Laundry Weight	**Rate per kg**
Less than 5 kg	RM 1.00
5 to less than 10 kg	RM 1.50
10 to less than 15 kg	RM 2.00
15kg or more	RM 2.50

- Ironing will cost an extra RM 5.00.
- Calculate the payments and display as shown in the output screen.

```
--------------------------------------
        Welcome to Clean Laundry
--------------------------------------
Laundry weight      : 20

Need ironing [Y/N]? : Y

Your Bill
---------
Weight : 20.00
Rate   : 2.50
Iron   : Y (RM 5.00)
Bill   : RM 55.00
```

3. Create a complete C program for lecturers to keep track of students' assessment.

- Get type of assessment from the user.
- Using **switch case** :
  - If their choice is Quiz:
    - Get quiz 1 and quiz 2 marks.
    - Sum up the marks.
    - Display the assessment type and total.
  - If their choice is Assignment:
    - Get the assignment marks.
    - Use **if else** statement to identify the status of the assignment based on the table below.

Assignment marks	**Assignment status**
0 to less than 50	Re-do Assignment
50 to less than 70	Good
70 to 100	Excellent
Other values	Not available

  - Display the assessment type and the assignment status.
  - If the user entered other values, display "Invalid assessment code entered"
  - Display the results as shown below.

```
Enter type of assessment  : Q
Enter Quiz 1 and Quiz 2 marks : 7.5 10

Assessment Type : Quiz
Quiz total : 17.50
```

```
Enter type of assessment  : A
Enter assignment marks : 67

Assessment Type : Assignments
Status : Good
```

4. Write the codes to calculate the payment that a guest should make for their stay in a hotel.
   - Get name, room code and number of days from user.
   - Based on the room code, identify the room type and price. Use **switch case** statement.

ROOM CODE	ROOM TYPE	ROOM PRICE
1 or D	Deluxe	RM 200.00
2 or T	Twin Sharing	RM 170.00
3 or S	Single	RM 120.00

   - Calculate the payment that the guest has to pay.
   - Display the information as shown below.

```
------------------------------------------------------------
                    WELCOME TO LEGEND HOTEL
------------------------------------------------------------
Rooms : Deluxe(1 or D)  Twin Sharing(2 or T)   Single(3 or S)

Enter your name      : Peter Parker
Enter Room code      : 2
Enter number of days : 5

------------------------------------------------
                PAYMENT RECEIPT
------------------------------------------------
Customer Name     : Peter Parker
Room Type         : Twin Sharing
Room Price        : RM 170.00
Number of days    : 5
Bill              : RM 850.00
```

```
------------------------------------------------------------
                    WELCOME TO LEGEND HOTEL
------------------------------------------------------------
Rooms : Deluxe(1 or D)  Twin Sharing(2 or T)   Single(3 or S)

Enter your name      : Mary Jane
Enter Room code      : S
Enter number of days : 4

------------------------------------------------
                PAYMENT RECEIPT
------------------------------------------------
Customer Name     : Mary Jane
Room Type         : Single
Room Price        : RM 120.00
Number of days    : 4
Bill              : RM 480.00
```

5. Create a menu as shown below.
   - Get movie code from the user. Using **if-else** statement, identify the movie code.
     - If the code is not *1* or *2*, display "Invalid Movie Code!" and terminate the system.
   - Get number of tickets and day of the movie from the user.
   - [Note: the day of movie has a range from 1-7; 1 as Monday, 2 as Tuesday, and so on]
   - Then, by using **switch case** statement, identify the day of movie.
     a. If that is a weekday (1-5)
        i. 20% discount for *The Lego Batman*
        ii. 30% discount for *Furious 8*
     b. If weekend (6-7)
        i. normal price
     c. Else,
        i. Set price to 0

   - By using another **if-else** statement, identify the price.
     a. If price is 0, display "Invalid day!" and terminate the system. Else, calculate the total price for the ticket purchase.
     b. Display the output as shown below.

```
-----------------------------------------
               MOVIE TITLE
-----------------------------------------
 1. The Lego Batman (RM 13.00)
 2. Furious 8       (RM 12.00)
-----------------------------------------

Enter movie code : 1
Enter number of ticket : 5
Enter movie day (1-7; 1 for Mon, 2 for Tue etc): 3

-------------------------------------
             RECEIPT
-------------------------------------
Movie         : The Lego Batman
No. of Ticket : 5
Total price   : RM 52.00
```

```
-----------------------------------------
               MOVIE TITLE
-----------------------------------------
 1. The Lego Batman (RM 13.00)
 2. Furious 8       (RM 12.00)
-----------------------------------------

Enter movie code : 2
Enter number of ticket : 2
Enter movie day (1-7; 1 for Mon, 2 for Tue etc): 7

-------------------------------------
             RECEIPT
-------------------------------------
Movie         : Furious 8
No. of Ticket : 2
Total price   : RM 24.00
```

```
-----------------------------------------
               MOVIE TITLE
-----------------------------------------
 1. The Lego Batman (RM 13.00)
 2. Furious 8       (RM 12.00)
-----------------------------------------

Enter movie code : 2
Enter number of ticket : 1
Enter movie day (1-7; 1 for Mon, 2 for Tue etc): 9

Invalid day selection!!
```

```
-----------------------------------
               MOVIE TITLE
-----------------------------------
 1. The Lego Batman (RM 13.00)
 2. Furious 8       (RM 12.00)
-----------------------------------

Enter movie code : 5
Invalid Movie code!
```

6. Write the codes to calculate the cost of attending a course.

- Display the menu on the screen.
- Get course code and number of participants attending the course from the user.
- Using **switch case,** assign the price and course name, based on the course code.
- Use **if else** statements to identify the discount and gift given based on the table below.

PARTICIPANTS	DISCOUNT	GIFT
10 or less	0%	None
20 or less	10%	Coffee Mug
More than 20	15%	Kingston 16GB Thumbdrive

- Calculate the total cost.
- Display the information as shown below.

```
COURSES OFFERED
A. Windows Azure (RM 1250.00 per pax)
B. JQuery for Beginners (RM 990.00 per pax)
C. Advanced PHP and MySQL (RM 2150.00 per pax)

Enter the COURSE CODE         : A
Enter number of participants : 15

Course name    : Windows Azure
Course price   : RM 1250.00
Participants   : 15
Discount       : RM 125.00 (10.00 %)
Gift           : Coffee Mug
Total payment  : RM 16875.00
```

```
COURSES OFFERED
A. Windows Azure (RM 1250.00 per pax)
B. JQuery for Beginners (RM 990.00 per pax)
C. Advanced PHP and MySQL (RM 2150.00 per pax)

Enter the COURSE CODE         : C
Enter number of participants : 40

Course name    : Advanced PHP and MySQL
Course price   : RM 2150.00
Participants   : 40
Discount       : RM 322.50 (15.00 %)
Gift           : Kingston 16GB Thumbdrive
Total payment  : RM 73100.00
```

REPETITION CONTROL STRUCTURES

1. Write a complete C program using **for loop** to compute total course fees for students.
   a. Get name (string), ID no (string), duration of study (integer) and the fee (float) for the first year from the user.
   b. Assume that the course fee increases **5%** every year.
   c. Calculate the annual fee and total course fees for the whole duration of study.
   d. Refer sample of output as shown below.

```
Enter name                      : Lina Ling
Enter ID                        : M100501
Enter fee (RM)                  : 4150
Enter duration of study (years): 5


-----------------------------------
      MULTIMEDIA UNIVERSITY
-----------------------------------
Student name      : Lina Ling
Student ID        : M100501
Duration of study : 5

Year     Course Fee
 1      RM 4150.00
 2      RM 4357.50
 3      RM 4575.38
 4      RM 4804.14
 5      RM 5044.35
-----------------------------------
Total Course Fees : RM 22931.37
-----------------------------------
```

2. Using **nested for loops**, display the following output.

```
Enter the length of the box : 3
Enter the height of the box : 5

 #  #  #
 #  #  #
 #  #  #
 #  #  #
 #  #  #
```

3. Write a simple C program that calculate the total payment for the purchase made.
   - Get product's name and price from the user.
   - Display the item and the price on the screen.
   - Repeat this for 3 products using a **do while** loop.
   - At the end, display the total payment that needs to be paid by the customer.

```
Enter product's name : Laptop
Enter the price      : RM 2500

Laptop : RM 2500.00

Enter product's name : Thumbdrive
Enter the price      : RM 50

Thumbdrive : RM 50.00

Enter product's name : Printer
Enter the price      : RM 250

Printer : RM 250.00

Total amount         : RM 2800.00
```

4. Write a simple C program that calculate the allowance and expenses of a student on a daily basis.
   - Get daily allowance from the user.
   - The program will continue if the daily allowance is not equals to -1. (Use a **while** loop)
     - Get expenses from the user.
     - Stop if they enter 0.
     - Use another **while** loop.
     - If they stop, display their daily allowance and the accumulated expenses.
   - When the user enters -1 as the daily allowance, stop the program and display the overall allowance and overall expenses.

```
Day 1 allowance. [Enter -1 to stop] : RM 20
-- Expenses 1 [type 0 to stop]      : RM 10
-- Expenses 2 [type 0 to stop]      : RM 5
-- Expenses 3 [type 0 to stop]      : RM 0

Day 1 allowance  : RM 20.00
Day 1 expenses   : RM 15.00

Day 2 allowance. [Enter -1 to stop] : RM 20
-- Expenses 1 [type 0 to stop]      : RM 17.5
-- Expenses 2 [type 0 to stop]      : RM 0

Day 2 allowance  : RM 20.00
Day 2 expenses   : RM 17.50

Day 3 allowance. [Enter -1 to stop] : RM 20
-- Expenses 1 [type 0 to stop]      : RM 5
-- Expenses 2 [type 0 to stop]      : RM 5
-- Expenses 3 [type 0 to stop]      : RM 1
-- Expenses 4 [type 0 to stop]      : RM 0

Day 3 allowance  : RM 20.00
Day 3 expenses   : RM 11.00

Day 4 allowance. [Enter -1 to stop] : RM -1

Total allowance for 3 days : RM 60.00
Total expenses for 3 days  : RM 43.50
```

SUBMISSION

Write the codes for a company that wants to track down the amount of donations from their clients (use a **while loop** and a **do while loop**).

- Ask the user whether they receive donations from clients.
- If they have (use **while loop**):
  - Ask the name of the company and the frequency of donation.
  - Use a **do while loop** to ask the donation amount from the company.
- If there are no more clients, display the summary as shown in the sample output.

```
Donation from clients? [Enter Y to continue]: Y

Enter client's name          : Maxis
Enter frequency of donation : 3
Enter amount of donation     : RM 15000
Enter amount of donation     : RM 20000
Enter amount of donation     : RM 25000

Total donation from Maxis : RM 60000.00

Donation from clients? [Enter Y to continue]: Y

Enter client's name          : Digi
Enter frequency of donation : 2
Enter amount of donation     : RM 30000
Enter amount of donation     : RM 45000

Total donation from Digi : RM 75000.00

Donation from clients? [Enter Y to continue]: N

Total Clients         : 2
Total Donations       : RM 135000.00
```