

LAB OBJECTIVES

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

- Create user defined functions to solve programming problems.
- Use string functions to manipulate string.
- Use built-in functions from the **math.h** and **string.h** header files

PRACTICE

1. The program will do the mathematical operation based on the user's choice.

- In *main()*:
 - Call function *get_choice()*.
 - Get 2 integer numbers from the user
 - Call function *calculate(...)* and pass the numbers and the choice.
- In *get_choice()*:
 - Display the menu.
 - Get choice from the user.
 - Use a **while loop** to make sure the user enters the correct value for choice.
If the entry is wrong, ask the user to re-enter the value.
 - Return the choice to *main()*.
- In *calculate()*:
 - Use a **switch case** statement to identify the type of operation and write the formula for it.
 - Display the answer.

```
A. Add numbers
B. Multiply numbers
C. Subtract numbers
D. Remainder of numbers

What is your choice? : X

Your choice is invalid. What is your choice? : a

Your choice is invalid. What is your choice? : D
Enter 2 numbers : 17 3
Answer : 2
```

2. You are required to write a program that calculates either the area or circumference of a circle.
- Write the function prototype.
 - Set the π as constant using the preprocessor directive.
 - In the *main()* function:
 - Display the menu.
 - Ask the user to enter their choice, 1 to calculate area and 2 to calculate circumference.
 - Using a **switch case** statement:
 - If the choice is 1, call function *get_area()*.
 - Display the area on the screen.
 - If the choice is 2, call function *get_circumference()*.
 - Display the circumference on the screen.
 - Use **while-loop** and ask user to proceed, repeat the steps below as long as user wants to.
 - In the *get_area()* function:
 - Ask the user to enter the radius of the circle.
 - Using the formula πr^2 calculate the area of the circle.
 - Return area.
 - In the *get_circumference()* function:
 - Ask the user to enter the radius of the circle.
 - Using the formula $2\pi r$ calculate the circumference of the circle.
 - Return circumference.

```
Key in [1] to calculate the area of circle
Key in [2] to calculate circumference of circle

Enter your choice : 1

Enter radius of circle : 10
Area of the circle : 314.20

Enter -1 to quit, enter any number to continue: 7

Key in [1] to calculate the area of circle
Key in [2] to calculate circumference of circle

Enter your choice : 2

Enter radius of circle : 10
Circumference of the circle : 62.84

Enter -1 to quit, enter any number to continue: -1
```

3. Write a program to calculate the amount of fees for the registration of subjects. Each credit hour costs RM150.00 (set as constant using preprocessor directive).
- In *main()*:
 - Ask the user whether they want to register a subject. If “Y”:
 - Ask the user to enter the subject code.
 - Call function *get_credit_hour(...)* and pass the subject code.
 - Calculate the total fees based on the cost and the number of credit hours.
 - Call function *display_receipt(...)* and pass the subject code, credit hour and fee amount as parameters.
 - If there is no more registration, display the total fees to be paid.
 - In function *get_credit_hour(...)*:
 - Use **if else** statement to identify the credit hour for each subject code. Use function **strcmp()**.
 - DCS5038 has 4 credit hours, DET5078 has 3 credit hours and DPR5038 has 2 credit hours.
 - Return the credit hour.
 - In function *display_receipt(...)*:
 - Display the subject code, credit hour and fee.

```
Need to register a subject? : Y
Enter the subject code      : DCS5038

Subject Code : DCS5038
Credit Hour  : 4
Total Fee    : RM 600.00

Need to register a subject? : Y
Enter the subject code      : DET5078

Subject Code : DET5078
Credit Hour  : 3
Total Fee    : RM 450.00

Need to register a subject? : N
Total fee to be paid : RM 1050.00
```

4. Write the complete C program to calculate the total course fees for a student.

- In *main()*:
 - Prompt the user to enter their name, id no (string) and duration of study (integer). Set the course *fee* with RM 10,000 (assume this is the starting fees for the first year that will gradually increase by 5% every year)
 - Display the name, id no and duration.
 - To calculate the total course fees, call function *calculate(.....)* and pass the fee and duration/years of study.
 - Display the total returned by the function call.
- In *calculate(.....)* :
 - Using any loop, calculate the annual fee and total course fees for the whole duration of study. Display the course fees for each year.
 - Return the total course fees.

```
Enter name : Janice Ooi
Enter ID   : 1070145
Enter duration of study [year] : 4

-----
                MULTIMEDIA UNIVERSITY
-----
Student name      : Janice Ooi
Student IDJani    : 1070145
Duration of study : 4

Year    Course Fee
1       RM 10000.00
2       RM 10500.00
3       RM 11025.00
4       RM 11576.25
-----
Total Course Fees : RM 43101.25
-----
```

5. Write a program that states the health condition of a user based on the Body Mass Index (BMI) value.

- In main() function:
 - Ask the user to enter their name, height, weight and gender.
 - Call function get_bmi(), passing the height and weight as parameter.
 - Call function get_status(), passing the gender and BMI as parameter.
 - Display all the information as shown below.
 - Repeat as long as user want to continue.
- In function get_bmi()
 - Calculate BMI using the formula, $BMI = \text{weight} / \text{height}^2$.
 - Return the value to main().
- In function get_status()
 - Use switch case statement to identify the gender
 - Use if-else statement and strcmp() to identify the status based on the BMI below.
 - Return the status to main().

Male BMI	Status
Less than 20.7	Underweight
Less than 25.6	Normal
Less than 32.3	Overweight
Others	Obese

Female BMI	Status
Less than 19.9	Underweight
Less than 25.3	Normal
Less than 36.0	Overweight
Others	Obese

```

Please enter your name      : Benny
Enter your height in meters : 1.67
Enter your weight in kilogram : 63.5
Enter [M] or [F] for gender : M

Benny, your height is 1.67 m and your weight is 63.50 kg.
Your BMI is 22.77, thus you are Normal.

Enter [Y] to continue : Y

Please enter your name      : Bella
Enter your height in meters : 1.54
Enter your weight in kilogram : 66.4
Enter [M] or [F] for gender : F

Bella, your height is 1.54 m and your weight is 66.40 kg.
Your BMI is 28.00, thus you are Overweight.

Enter [Y] to continue : N
  
```

6. Write the complete C program to calculate the payment for the tour package selected by the user.

- In *main()*:
 - Ask the user to enter the destination code and the number of days.
 - Call function *get_dest(...)* and pass destination code.
 - Call function *get_rate(...)* and pass number of days.
 - Calculate the payment for the tour.
 - Display the destination and the payment amount.
 - Repeat for 3 times.
- In function *get_dest(...)*:
 - Using a **switch case** statement, identify the destination name based on the destination code.
 - Return the destination name.
'P' is "Penang", 'L' is "Langkawi" and 'T' is "Tioman Island".
- In function *get_rate(...)*:
 - Use **if else** statement to identify the rates based on number of days.
 - Less than 3 days, the rate will be RM 295.00.
 - 3 to 5 days stay, the rate will be RM 250.00.
 - More than 5 days stay, the rate will be RM 210.00.

```
Enter Destination code : P
Days of stay          : 2

Destination : Penang
Payment     : RM 590.00 (2 x RM295.00)

Enter Destination code : L
Days of stay          : 5

Destination : Langkawi
Payment     : RM 1250.00 (5 x RM250.00)

Enter Destination code : T
Days of stay          : 7

Destination : Tioman Island
Payment     : RM 1470.00 (7 x RM210.00)
```

7. Write the complete C program to calculate the grand total collected from the sales of homemade cookies.
- In *main()* function :
 - Call *function menu()* to display the menu.
 - Get the user's *name*, *choice* and *quantity*.
 - Validate user's choice (must be between 1, 2 or 3 ONLY, otherwise ask to re-enter the choice).
 - Call *function get_item(...)* and send *choice* to get the *item name*.
 - Call *function get_price(...)* and send *choice* to get the *price*.
 - Calculate *payment* by multiplying *price* with *quantity*.
 - Keep track of how many of each item has been sold.
 - Call *function display(...)* and send appropriate variables to be displayed on screen.
 - Repeat these processes as long as the choice is 'Y'.
 - Once the loop terminates:
 - Display the summary by showing the total purchase and also how many of each item has been sold.
 - In *function menu()* :
 - Display the menu as shown in the output screen.
 - In *function get_item(...)* :
 - Identify the *item name* using switch-case statement based on the *choice*.
 - Return the *item name*.
 - In *function get_price(...)* :
 - Identify the *price* of the item using switch statement based on the *choice*.
 - Return the item *price*.
 - In *function display(...)* :
 - Display all information as shown in the output screen.

```

-          WELCOME TO MYHome COOKIES          -
-----
1.  Chocolate Chip Cookies      [ RM 25.00 ]
2.  Best selling Almond Cookies [ RM 23.00 ]
3.  Cranberry Oats Cookies     [ RM 24.30 ]
-----
Enter name      : Amanda
Enter choice    : 5
Re-Enter choice : 2
Enter quantity  : 3
-----
-          RECEIPT OF PURCHASE          -
-----
Name           : Amanda
Item           : Almond Cookie
Price          : RM 23.00
Quantity       : 3
Payment        : RM 69.00
-----
Enter [Y] to continue : Y
-----
-          WELCOME TO MYHome COOKIES          -
-----
1.  Chocolate Chip Cookies      [ RM 25.00 ]
2.  Best selling Almond Cookies [ RM 23.00 ]
3.  Cranberry Oats Cookies     [ RM 24.30 ]
-----
Enter name      : Bella
Enter choice    : 1
Enter quantity  : 4

```

```

-          RECEIPT OF PURCHASE          -
-----
Name           : Bella
Item           : Choc-chip Cookie
Price          : RM 25.00
Quantity       : 4
Payment        : RM 100.00
-----
Enter [Y] to continue : N
-----
-          TODAY'S SUMMARY          -
-----
Total Payment   : RM 169.00
Item 1 sold     : 4
Item 2 sold     : 3
Item 3 sold     : 0

```


SUBMISSION

1. Write a C program to generate a customer's purchase receipt.
 - In the *main()* function:
 - Ask the user to enter the product code and quantity.
 - Call function *get_price(...)* and pass product code to get the product price.
 - Call function *get_discount(...)* and pass the quantity to get the value of discount.
 - Call function *get_freegift(...)* and pass the product code to know the free gift.
 - Calculate the total payment.
 - Call function *display(...)* and pass the product code, product price, quantity, free gift, total price, discount amount and the actual bill.
 - Repeat as long as user wishes by using a **do-while** loop.
 - In the *get_price(...)* function:
 - Using a switch case statement, identify the price of the product based on the product code.
 - Code 'K' is RM 19.90.
 - Code 'M' is RM23.60.
 - Code 'C' is RM45.00.
 - Return the price.
 - In the *get_discount(...)* function:
 - Using **if else** statement, identify the amount of discount given based on the quantity bought.
 - Return the discount amount.

QUANTITY	DISCOUNT
10 or less	RM 0.00
More than 10 and 20 or less	RM 10.00
More than 20 and 30 or less	RM 20.00
More than 30	RM 30.00

- In the *get_freegift(...)* function:
 - Using a **switch** statement, identify the free gift given to the customer.
 - Product Code 'K' will get a "Mouse Pad".
 - Product Code 'M' will get a "CD Cover".
 - Product Code 'C' will get a "Screen Protector"
 - Return the free gift.
- In the *display(...)* function:
 - Display product code, price, quantity, free gift, total amount, discount and actual payment.

```
Enter the Product Code : M
Enter quantity          : 11

Product Code   : M
Product Price  : RM 23.60
Quantity       : 11
Free Gift      : CD Cover
Total          : RM 259.60
Discount       : RM 10.00
Payment        : RM 249.60

Enter [Y] to continue: Y

Enter the Product Code : K
Enter quantity          : 7

Product Code   : K
Product Price  : RM 19.90
Quantity       : 7
Free Gift      : Mouse Pad
Total          : RM 139.30
Discount       : RM 0.00
Payment        : RM 139.30

Enter [Y] to continue: Y

Enter the Product Code : C
Enter quantity          : 40

Product Code   : C
Product Price  : RM 45.00
Quantity       : 40
Free Gift      : Screen Protector
Total          : RM 1800.00
Discount       : RM 30.00
Payment        : RM 1770.00

Enter [Y] to continue: N
```