**Practical 7 (Part A)**

**Value returning Functions**

1. Write the required functions as below:
   1. Write a function called MusicBanner to print the banner:

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\* Welcome to \*

\* ABC Music School \*

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* 1. Write a function called MusicMenu to print a menu as follows:

ABC Music School

1. Piano
2. Violin
3. Guitar
   1. In the main program, perform the following:

* Call the MusicBanner and MusicMenu to display the output.
* Allow the user to key in the selection. Your program should display the correspondent message to the user’s selection. For instance, if user chooses 1 then the program would display

Your choice is Piano.

* Display the fees for the type of courses chosen. Fees per month for piano, violin and guitar are RM120, RM150 and RM80 respectively. For instance, if the user chooses 2, then the program would display

Piano class is RM120 per month.

1. Write a C++ program that is able to perform the following:

1

SELECT OPTION TO CALCULATE:

==========================

[S] square of a number

[Q] squareroot of a number

[P] X power of Y

Press [E] to exit the program

Enter option >>

2

3

4

1. Create a function named display\_menu to display the menu as shown above.
2. Create three different functions that perform the correspondent arithmetic calculation:
   * Function square will read a number from the user, calculate the square of the number (*number2*), and print the answer on the screen.
   * Function squareroot will read a number from the user, calculate the square root of the number (*√number*), and print the answer on the screen.
   * Function power will read two numbers, x and y, from the user. Then it will calculate and display the answer of x power of y (*xy*).
3. If the user press E. The program should print “Program ends now” and stops.
4. Create a function named valid\_input to return the valid character entered by the user. The function will perform the following:
   * Accept only a **character** from the user.
   * Perform validation using appropriate functions (e.g. isdigit). For instance, if the user enters a digit, display “Digit is not allowed”.
   * If the user enters lower case character (e.g. ‘a’), it will convert the input to upper case (e.g. ‘A’).
   * If the user enters character other than S, Q, P or E, it displays “Please enter only S, Q, P or E”.
   * Displays appropriate message and prompts for input again until the user enters the desired option.
5. Lastly, complete the main program to produce the solution for the problem above. Use while loop to repeat the program above until the user chooses the option of ‘E’.

**Pass-by-value Functions**

1. Write a program to ask the user to enter a single character (e.g. **“\*”**) and then write the **printOutput** method to accept the character and display the output as follows:

**\*\*\*\*\***

**\*\*\*\***

**\*\*\***

**\*\***

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Note: Use nested loop to produce the output above

1. Write a C++ program that contains the following function:

**int sumToN (int n)**

that computes the sum of all the positive integers from 1 to n (inclusive). In your program, include a **main** function to test the function that you have written. The **main** function should prompt the user to enter an integer and then display the sum of all the positive integers up to that integer value.

1. Write a C++ program that will calculate the perimeter and area of a right triangle. You must use three functions:
2. Function calculatePerimeter to calculate the perimeter of the triangle and returns the perimeter value.
3. Function calculateArea that will calculate the area of the triangle and returns the area value.
4. Function displayResult that will display the perimeter and area values on the screen.

Your main program will ask the user to provide the length of two sides (x and y) of the right triangle. Use **cmath** library function to assist you. Given below are the formulas:

 

x

z

1. Write a function Get\_grade that takes a student’s mark to determine the grade based on the table below, and returns the grade as a letter character. Write a function to validate the user’s input to verify that it is within 0 to 100 marks.

|  |  |
| --- | --- |
| 80-100 | A |
| 65-79 | B |
| 50-64 | C |
| 40-49 | D |
| 0-39 | F |

Write a function Get\_grade\_point that takes the student's letter grade (i.e. A,B,C,D,F) as a char and returns the corresponding numerical grade point (4.0,3.0,2.0,1.0,0.0). Use a switch statement.

Write the main program that includes the statements as follows.

int mark;

char grade;

cout << "Enter your marks: ";

cin >> mark;

cout << "The corresponding grade is: " << Get\_grade(mark) << endl;

cout << "The corresponding Grade Point is: "

<< Get\_grade\_point(grade) << endl;

**Extra exercise**

1. Write a C++ program with function that will calculate the sum of the following series:



1. Write a C++ program that will create a menu as below. Each option Add, Subtract, Divide, Multiply must be processed accurately with function. Requirements of the program:
   1. This program only will exit when user key-in Q selection.
   2. When chosen selection has been performed, it must go back to the menu selection.
   3. Selection is non-case sensitive. E.g A = a, S = s, …
   4. Remark: Remember to validate the input, and prompt appropriate error message. Error by the user may include non-digit character, and divide a number with zero.
2. Easy Car Park charges fees according to vehicle type and amount of time parked:

Vehicle Vehicle Type Rate

Car c RM 2 per hour, or part thereof

Bus b RM 3 per hour, or part thereof

Truck t RM 4 per hour, or part thereof

1. Write a function **void** **displayVehicleRate** that accepts the vehicle type as parameter, then displays (in one line) the vehicle name in full and the corresponding parking rate as listed above.
2. Write a function **char getVehicleType** that will prompt a user to enter a vehicle type and return the validated vehicle type.
3. Write a function **int calcHoursParked (int inHr, int inMin, int outHr, int outMin)** that calculates and returns the hours parked as an integer. If any data or result is abnormal, it returns -1. Eg. if a vehicle entered at 10:30 and exited at 14:20 (international time), the 4 parameters would be 10, 30, 14, 20 and the function should return the value 4 (any fraction of an hour will be treated as 1 hour). Vehicles cannot enter / exit after midnight and before 7:00am, nor are they allowed to park overnight.
4. Write a function **parkingCharge** that receives 2 parameters: vehicleType and hrsParked, and returns the appropriate parking charge.
5. Write the **main** program that calls the above functions as appropriate and displays the parking ticket. (If the hours parked was returned as -1, display an appropriate message, eg. “Error, please see the management.”) Eg of format:

