**Tutorial 7**

1. Define modularization. Discuss the benefits of modular design in programming.
2. A program is designed to compute a customer’s car rental charges. Every car is charged at RM25 per day with addition to a charge of RM 0.40 for every kilometer used. Finally, the final rental charges and the detailed breakdown of charges should be displayed on the screen.
   1. Draw a structure chart to represent the division of tasks above.
   2. Based on the structure chart given in (a), draw flowcharts to describe the solution of each task.
   3. Based on the flowchart given in (b), write a program which integrates the necessary functions as described.
3. Given the code below, answer the following questions.

1 int main()

2 { int n, res=1;

3 cout << "N Factorial: " << endl;

4 do{

5 cout << "Enter a positive number: ";

6 cin >> n;

7 while(n<1);

8 for(int i=n; i>0; i--)

9 {

10 res = res \* n;

11 }

12 cout << n << "! = " << res << endl;

13 return 0;

14 }

1. Suggest how would you modularize the program above. Can you suggest two modules?
2. Draw the structure chart to represent the modular design of your program as suggested in (a).
3. Rewrite the above program based on your design given in (b).
4. Given the following output as shown in Figure 1, answer the following questions.
5. Suggest four different modules that are appropriate for the program.
6. Draw the structure chart to represent the modular design of your program as suggested in (a).
7. Design the Pseudocode for the **main program**.
8. Produce the definitions of the four functions (modules) you have suggested, and write the main program that would invoke (call) the four functions. The output of the main program should be identical as shown in Figure 1.

SUPERSTAR cinema ticketing system

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Movie for today:

1. Man of Steel Returns

2. The Dark World of Thor

3. The Hobbyists

Select movie > ***1***

Show Time for today:

1. 11.30

2. 14.50

3. 18.00

4. 21.10

5. 12.20 mn

Select time > ***1***

Price per ticket: RM10.00

Enter number of tickets > ***3***

Total amount: RM 30.00

Enter payment > 50

Balance: RM 20.00

Remark: Bolded numbers are the inputs by the user

Figure 1: Sample output screen

1. Given the code below, answer the following questions.

1 #include <iostream>

2

3 const int a = 17;

4 int b, c;

5 int main()

6 {

7 b=4;

8 c=6;

9 SomeFunc(42.8);

10 cout << "a = " << a

11 << " b = " << b

12 << " c = " << c;

13

14 return 0;

15 }

16 void someFunc(double c);

17 {

18 double b = 2.3;

19 cout << "a = " << a

20 << " b = " << b

21 << " c = " << c;

22 }

1. The code cannot be compiled. Identify the error.
2. Assume that the correction in (a) is done properly. What is the output of the program?