Assignment - 02

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SECTION A – TRUE/FALSE QUESTIONS [Total 8 marks]

There are **FOUR (4)** questions in this section. For each statement given in this section, identify whether the statement is **TRUE/FALSE** and write your answer with your **reason** in the space given. Each question carries **2** marks.

1. The following C++ code in Figure 1 determines the amount of interest based on user's amount value in his/her account. If the amount value in his/her account falls under option 2, the program will only calculate interest = 2.6 for that particular's user account.

```
switch (account_value)
{
      case 1:
          interest = 2.3;
          break;
      case 2:
          interest = 2.6;
      case 3:
          interest = 2.9;
          break;
      default:
          interest = 0.0;
}
```

Figure 1

Answer : False. The interest will be 2.9 for that user account which falls under option 2.

Reason :
As per the switch case, users which falls under option 2 based on the account balance will get interest value as 2.6 initially but since there is no break statement under case 2, code flow will get continued with option 3 as well.So there the interest value gets replaced by 2.9 value and Flow gets broken as we have break statement in case 3.

2. If **`x=3`** and **`y=2`**, the following segment program in Figure 2 will produce 0 when it is executed.

```
int main()
{
      int x, y;
      cout<<" Please enter two numbers: ";
      cin>> x>>y;

      for (int i=1;i<=y;i++)

          for (int j=1;j<=x;j +=2)
          {
               cout<<setw(2)<< y/x;
          }
      system ("PAUSE");
      return 0;
}
```

Figure 2

Answer : True,this program prints 0 for 4 times.

Reason :
Since the outside for loop will run for twice (for i =1 and I=2) and inside for loop will run for twice again (for j=1 and j=3) values.System prints 0 since the y/x value which
means (2/30 value is 0 and setw(2) means it gives space for two letters to print on the console from right to left.

3. The `terminate()` function causes a program to terminate, regardless of which function or control mechanism is executing.

Answer : False.

Reason :
In c++the exit () function is called naturally to stop the program at whatever point an unhandled exemption is there we can likewise, call the end work in the program with no special case taking care of in that circumstance it do ends the program and prints the message "end called without a functioning special case.

4. The output of the following program in Figure 3 is as illustrated in Figure 4.

```
#include <iostream>
using namespace std;

int call(int
  x){ static int a =
  10; int b;
   b=x;
   a+=b++;
   return a;
  }

int main()
{

  cout << "The value return is " << call(5) << endl;
  cout << "The value return is " << call(12) << endl;
  system("pause");
  return 0;

}
```

Figure 3

```
The value return is 15
The value return is 27
Press any key to continue . . .
```

Figure 4

Answer : True.

Reason :
when we call function call(5) then value of b=5 inside the call(int x) function since b=x. now we have b=5 and a=10 (defined in the call ()function) operation is :a+=b++=>a=a+B++ ,here post ++ operator 1 is added in the variable after the operation.Thus,a=10+5=15,b=6;
hence it prints "the value return is 15".Again,in the second call of function call(12) the value of a is 15 and the value of b=x=12.So,a+=b++=>a=a+b++=>a=15+12=27.Hence it prints "the value return is 27".

SECTION B – STRUCTURE QUESTIONS [Total marks 50]

There are **FOUR (4)** structured questions. Answer all questions in the space provided. The marks for each part of the question is as indicated.

1. (a) Based on the information displayed in Figure 5, complete the missing C++ (Figure 6) code by writing a ternary conditional operator. [5 marks]

```
Enter 'y' or non-'y':
y
If 'y', answer is = 1
Press any key to continue . . .
```

```
Enter 'y' or non-'y':
p
Else, answer is = 0
Press any key to continue . . .
```

Figure 5

```
#include <iostream>
using namespace std;

int main()
{
      // initialize x to a dummy value
      char x = 'n';
      cout << "Enter 'y' or non-'y': " << endl;
      cin >> x;
      // conditional operator

      cout<<(x=='y'?"If 'y', answer is = 1":"Else, answer is = 0");


         cout << endl;
         system("pause");
       return 0;
}
```

Figure 6

(b) Consider the following output screen in Figure 7 that shows input and output of a banking activity. When deposit is chosen, the latest balance is the addition of old balances with the amount deposited, and when withdrawal is chosen, the latest balance is the subtraction of the old balance with the amount deposited. When any other character is entered, you should let the user know that the code is not allowed, and he/she must try again. Assuming your current balance in the account is RM300, write a complete C++ code for the following program by using 'switch' case statements. [8 marks]

```
Enter your transaction code, d – deposit, w – withdrawal:
d
Enter amount RM150
Your current balance is now RM 450
```

Figure 7

Answer 1(b):

```
#include <iostream>
using namespace std;
int main()
{
double balance=300,amount;
char choice;
cout<<"Enter your trasaction code, d- deposit,w-withdraw :";
cin>>choice;
switch(choice){
case 'd': cout<<"Enter amount RM";
cin>>amount;
balance+=amount;
cout<<"Your Current Balance is now RM "<<balance<<endl;
break;
case 'w': cout<<"Enter amount RM";
cin>>amount;
balance-=amount;
cout<<"Your Current Balance is now RM "<<balance<<endl;
break;
default:
cout<<"you have chosen wrong input\n";
}
return 0;
}
```

2.

```
int main()
{
int a, x =0;
cout<<" please enter  a number ";
cin>> a;

if (a == 1 || a==2)
   x ++;
else if ( a==3 || a==4)
     x--;
else cout << x+=2;
     cout << x;
system ("PAUSE");
return 0;
}
```

Figure 8

(a) Based on C++ code in Figure 8, do the following amendment as follows:

(i) Convert the if statement to a switch-case statement.

(ii) Also, write an input validation loop that asks the user to enter a number in the range of 1 through 4. [7 marks]

Answer 2(a):

```
#include <iostream>
#include <cmath>
using namespace std;
int main()
{
int a;
int x=0;
do{
cout<<"Please enter a number ";
cin>> a;
system("CLS");
switch(a){
case 1:
 x++;
 cout<<x<<endl;
 break;
```

Answer 2(a):

```
case 2:
 x++;
 cout<<x<<endl;
 break;
case 3:
 x--;
 cout<<x<<endl;
 break;
case 4:
 x--;
default:
 cout<<"Invalid, please enter a number from 1-4\n";
 cout<<(x+=2)<<endl;
 system("PAUSE");
 system("CLS");
}
}while (a<1 || a>5);
return 0;

}
```

3. You are required to develop a program to compute and display the charges for patients of Hospital Tun Aminah Johor.

   (a) Write a function to get the inputs from user. The function should accept reference arguments in order to access the parameters in the `main()` function. The function should ask for the following attributes in Table 1: [4 marks]

Table 1

Patient Attributes
Number of days spent
Daily room rate
Medication charges
Service charges

Answer 3(a):

```
#include <iostream>
using namespace std;
void userInput(int &numDaysSpent,float &dailyRoomRate, float &medicationCharges,float
&serviceCharges){
cout<<"Enter number of days spent: ";
cin>>numDaysSpent;
cout<<"Enter Daily room rate: ";
cin>>dailyRoomRate;
cout<<"Enter medication charges: ";
cin>>medicationCharges;
cout<<"Enter service charges: ";
cin>>serviceCharges;
}
int main() {
int numDaysSpent;
float dailyRoomRate,medicationCharges,serviceCharges;
userInput(numDaysSpent, dailyRoomRate,medicationCharges,serviceCharges);
{
cout<<"The details are as follows: "<<endl;
cout<<"Number of days Spent: "<<numDaysSpent<<endl;
cout<<"Daily room rate: "<<dailyRoomRate<<endl;
cout<<"Medication Charges: "<<medicationCharges<<endl;
cout<<"Service Charges: "<<serviceCharges<<endl;
}
return 0;
}
```

(b) There are two types of patient in Hospital Tun Aminah Johor as described in Table 2. In the program, patient's type is declared as global variable. The following formula in Table 2 is used to compute the total charges. Write two overloaded function to calculate the total charges. One of the functions should accept arguments for the in-patient, while the other function accepts arguments for out-patient. Both functions should return the total charges. [5 marks]

Table 2

Type	Formula
In-patient	Total charges = Number of days spent * Daily room rate + Medication charges + Service charges
Out-patient	Total charges = Medication charges + Service charges

Answer 3(b):

```
#include <iostream>
using namespace std;
string patient_type;
float totalCharges(int days, float room_rate, float medication_charges, float service_charges);
float totalCharges(float medication_charges, float service_charges);
int main ()

{

float inpatient_totalCharges = totalCharges(4,100,520.9,25.0);
float outpatient_totalCharges = totalCharges(380.5,45);

cout << "TotalCharges for inpatient: " << inpatient_totalCharges << endl;
cout << "TotalCharges for outpatient: " << outpatient_totalCharges << endl;
return 0;
}
//This method will calculate totalCharges for inpatient
float totalCharges(int days, float room_rate, float medication_charges, float service_charges)
{
float total_charges = days * room_rate + medication_charges + service_charges;
return total_charges;
}
```

Answer 3(b):

```
//This method will calculate totalCharges for outpatient
float totalCharges(float medication_charges, float service_charges)
{
float total_charges = medication_charges + service_charges;
return total_charges;
}
```

4. (a) Based on the Program in Figure 9, what is the output displayed when the program is executed? [2 marks]

```
#include <iostream>
using namespace std;

int two(int n)
{
    int ans;
    if (n==1)
       ans=0;
    else
        ans = 1+two(n/2);
    return ans;
}

int main()
{
    int y;

    y = two(13);
    cout<< y;
    system("pause");
    return 0;
}
```

Figure 9

Answer 4(a):

Output is : 3

(b) What is the output of the above program (Figure 10) if the user enters **12** and **14**?

[9 marks]

```
#include <iostream>
using namespace std;

void func1(int = 5, int = 6);
void func2(int &, int &, int &);
void func3(int&, int&);
void func4(int,int,int);

int main()
{
    int x=0, y=0,z=0;
    func1();
    cout<<x <<" "<<y<<" "<<z<<endl;
    func3(x,y);
    cout<<x <<" "<<y<<" "<<z<<endl;
    func2(x,y,z);
    cout<<x <<" "<<y<<" "<<z<<endl;
    func4(x,y,z);
    cout<<x <<" "<<y<<" "<<z<<endl;
    system("pause");
    return 0;
}

void func1(int a, int b)
{
     a++;
     b+=a;
     cout<<a<<" "<<b<<endl;
}

void func2(int &a, int&b, int&c)
{
  b++;
     c--;
     a=b+c;
}

void func3(int &a, int&b)
{
     cout<<"Enter two numbers: ";
     cin >> a >> b;
}

void func4(int a, int b, int c)
{
     a=b-c;
     cout <<a << " " << b <<" " << c << endl;
}
```

Figure 10

Answer 4(b):

If user enters **12** and **14** on the above program, the output is :

```
6 12
0 0 0
Enter two numbers: 12 14
12 14 0
14 15 -1
16 15 -1
14 15 -1
sh: 1: pause: not found


...Program finished with exit code 0
Press ENTER to exit console...
```

(c) Given the following excerpted program (Figure 11):

```
#include <iostream>
#include <iomanip>
using namespace std;

int input();
int  totalDay(int);
double calcAvg(int, int);

int main()
{
    int x;
    double avg;
    x = input();
    avg = calcAvg(x,totalDay(x));
    cout<<fixed<<showpoint<<setprecision(2);
    cout<<avg;
    system("pause");
    return 0;
}
```

Figure 11

(i) Based on the **`main()`** function in Figure 11, you are required to write the following user-defined functions: [10 marks]

Table 3. User-defined functions

Function	Description
`input`	This function asks the user for the number of employees in the company. This value should be returned as an **`int`**. The function accepts no argument.
`totalDay`	This function accepts one argument: the number of employees in the company. The function should ask the user to enter the number of days each employee absent during the past year. The total of these days should be returned as an **`int.`**
`calcAvg`	This function accepts two arguments: the number of employees in the company and the total number of days absent for all employees during the year. The function should return, as a **`double`**, the average number of days absent. This function does not display any outputs and does not ask the user for input

Answer 4(c-i):

```
int input(input)
{
//Ask and store in employee.
int employee;
cout<<"Enter number of employee :"<< '
\n'
cin >>employee ;
return employee;
}
```

Answer 4(c-i):

```
int totalDay (employee)
{
//It will score the total sum.
int sum =0;
for (int i = 0;i < employee ; i ++)
{
//Ask users
int temp = 0;
cout<< "Enter number of absent : \n"
;
sum +=temp;
};
return sum;
}
```

Answer 4(c-i):

```
double CalcAvg(employee ,
absents)
{
//Returns the average.
return absents /employee;
}
```