**CS 101: Introduction to ComputING**

**FUNCTIONS EXERCISE**

**Part A) FUNCTION PROTOTYPES and DefiNITIONS**

***Write the complete function prototypes and definitions for the following scenarios.***

Note: Don’t use cin and cout in the function instead use parameters.

1. A value-returning function isVowel, that returns true if a given character is a vowel and otherwise returns false.
2. A function that takes Celsius as input temperature and outputs the corresponding temperature in Fahrenheit
3. A function that takes as input mass and speed of light and outputs the corresponding amount of energy associated with the mass.
4. A function for inputting length, color code and size of an object
5. A function for determining whether a student qualifies for a prize or not, when given his id and letter grade.
6. A function that calculates different coordinates of the trajectory of an object when given the initial velocity of the object. The total coordinates computed depend upon the initial velocity.

**Part B) FUNCTION OutputS**

1**. Consider the following function and answer question given at the end.**



2**. What is the output of following program?**



**3. What is output of the following program?**



**4. Scope Example.**

**What is output of the following program?**

|  |  |
| --- | --- |
| int x = 10;  void myFunctionA(int x)  { Output(x);  }  void myFunctionB()  { int x=5;  Output(x);  }  void myFunctionC()  {  int x=100;  int i=0;  for (i=0;i<10;i=i+1)  {  int x = i;  Output(x);  }  Output(x);  } | void myFunctionD()  {  x = x+1;  }  void Output(int x)  {  cout << "x is : " << x;  }  int main()  {  x = x+1;  Output(x);  myFunctionA(x);  myFunctionB();  myFunctionC();  myFunctionD();  return 0;  } |

**4. Scope Example2.**

**Show the value of different variables.**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **int counter = 0;**  **int function1(int x,int &y)**  **{**  **counter = counter +5;**  **x = x\*100;**  **y = x\*10;**  **return x\*y;**  **}**  **int function2(int &x,int &y,int &z)**  **{**  **counter = counter \* 10;**  **x = y\*z;**  **y = x\*y;**  **z = z\*z;**  **return x+y+z;**  **}** | |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  | **Counter** | **Result** | **x** | **y** | **z** | | **void main()**  **{**  **int x=10,y=100,z=1000;**  **int Result = 1;**  **counter=counter+1;** |  |  |  |  |  | | **Result = function1(x,y);** |  |  |  |  |  | | **x=1;y=2;z=3;** |  |  |  |  |  | | **Result = function2(x,y,z);**  **}** |  |  |  |  |  | |

**5. Life Time of a variable**

Build the stack when the program is run. How many maximum functions are stacked during the running of the program?

|  |  |
| --- | --- |
| void FunctionC()  {  int z = 1;  z = z\*2;  }  int FunctionB()  {  int j = 10;  j = j+1;  FunctionC();  j=j\*2;  return j;  } | void FunctionA()  {  int counter = 5;  counter = counter + FunctionB();  counter = counter + 1;  }  int main()  {  int x = 0;  FunctionA();  return 0;  } |