Department of Computer Systems Engineering

University of Engineering & Technology, Peshawar

**Computer Programming**

**Midterm Exam, Spring 2016**

**Maximum Time Allowed: 2 Hours Maximum Weightage: 25**

* Be precise and concise in your answers. Attempt all questions on the question paper in the provided space
* Please indent and comment your code properly. Un-indented/commented code will not be checked

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| **Problem 1**  **1.**  **2.**  **3.**  **4.** | **Identify and correct errors in each of the following code snippets. Where possible only provide the corrected lines in your answer.**  **#include <iostream> Solution**  **using namespace std;**  **int main()**  **{**  **cout<<"x = "<<x<<endl;**  **int x;**  **x = 89;**  **return 0;**  **}**  **#include <iostream>**  **using namespace std; Solution**  **void ftn(int&);**  **int x=10;**  **int main()**  **{**  **int x = 6;**  **ftn(::x);**  **cout<<"X = "<<x<<endl;**  **return 0;**  **}**  **void ftn(int &x) {**  **x+=10;**  **}**  **#include <iostream>**  **using namespace std**  **int Main(){**  **int a = -6;**  **while(a<=0){**  **cout<<"Increasing a..."<<a<<endl;**  **++a; } }**  **Solution:**  **#include <iostream>**  **using namespace std;**  **int main(){**  **int a = 16;**  **while(a=>0){**  **a = --a-2;**  **cout<<"a = "<<a<<endl;**  **}**  **}**  **Solution:** | **02 Points**  **03 Points**  **01 Point**  **2 Points** | |
| **Problem 2** | **What will be the value of x after each of the following statements is executed. Assume x=5 and y=5** | **02 Points** | |
| **Problem 3** | **#include<iostream>**  **void main()**  **{**  **float series = 0.0,term;**  **int count = 0, i;**  **while(count<=8)**  **{**  **i = count;**  **term = 1.0;**  **while(i>0)**  **{**  **term \*= i;**  **--i;**  **}**  **term /= term\*term;**  **series += term;**  **++count;**  **}**  **}**  **This C++ program evaluates an arithmetic series upto a certain number of terms. Please write down the series upto the exact number of terms, the sum of which would be in the float variable “series” after this program is done executing.** | **03 Points** | |
| **Problem 4** | **What would be the output of the following program? The program contains no errors whatsoever.**  **#include <iostream>**  **using namespace std;**  **int function(int);**  **int subroutine(int);**  **int subroutine2(int);**  **int procedure(int);**  **int main(){**  **cout<<"Procedure = "<<procedure(2);**  **return 0;**  **}**  **int function(int f) {**  **cout<<"function called."<<endl;**  **return 2\*f;**  **}**  **int subroutine(int s) {**  **cout<<"subroutine called."<<endl;**  **return 3\*s+subroutine2(s);**  **}**  **int subroutine2(int z) {**  **cout<<"subroutine2 called."<<endl;**  **return z\*z;**  **}**  **int procedure(int p) {**  **cout<<"procedure called."<<endl;**  **cout<<"type1 = "<<function(p)<<endl;**  **cout<<"type2 = "<<subroutine(p)<<endl;**  **cout<<"Exiting procedure"<<endl;**  **return p\*function(subroutine(2));**  **}**  **Solution:** | **05 points** | |
| **Problem 5** | **#include <iostream>**  **using namespace std;**  **int mystery(int);**  **int main(){**  **int a = 1;**  **while(a<=6){**  **cout<<"mystery "<<a<<" = "<<mystery(a)<<endl;**  **++a;**  **}**  **return 0;**  **}**  **int mystery(int x){**  **if(x==1)**  **return 1;**  **else**  **return x+mystery(x-1);**  **}**  **What would be the output of the above program? What does the mystery function calculate?** | **04 points** | |
| **Problem 6** | **Modify the following code (if necessary) to produce the output given in 1, 2, 3 and 4 assuming given values for x and y. Use proper indentation techniques. You must not make any changes other than inserting braces.**  **if ( y == 8)**  **if ( x == 5)**  **cout<<”@@@@@”<<endl;**  **else**  **cout<<”\*\*\*\*\*”<<endl;**  **cout<<”$$$$$”<<endl;**  **cout<<”&&&&&”<<endl;**   1. **Assuming x = 5 and y = 8, the following output should be produced.**   @@@@@  $$$$$  &&&&&   1. **Assuming x = 5 and y =8, the following output should be producted.**   @@@@@   1. **Assuming x = 5 and y =8, the following output should be produced.**   @@@@@  &&&&&   1. **Assuming x = 5 and y = 7, the following output should be produced.**   \*\*\*\*\*  $$$$$  &&&&& | **08 points** |
| **Problem 7** | **The following is a piece of C++ code, whose intention was to print an asterisk 20 times. But you may notice that, it doesn't work.**  **#include <iostream>**  **using namespace std;**  **int main()**  **{**  **int n = 20;**  **for(int i = 0; i < n; i-- )**  **cout<<"\*";**  **return 0;**  **}**  **Well fixing the above code is straight-forward. To make the problem interesting, you have to fix the above code, by changing exactly one character (e.g. x is one character, 10 is two characters). Only write down the modified line of code with only single character change.**  **Solution:** | **03 Points** | |
| **Problem 8** | **Write a minimal C++ program that prints the following on the screen? You are allowed to print only one character at a time. You cannot use more than two loops (while or for).**  **\*\*\*\*\*\*#**  **\*\*\*\*\*##**  **\*\*\*\*###**  **\*\*\*####**  **\*\*#####**  **\*######**  **Your CODE:** | **4 Points** | |
| **Problem 9** | **Write a program that reads an integer from the user, determines the number of digits and sum of digits in it. For example, if the user enters.**  **Input:** 2579  **Output:**  No. of digits: 4  Sum of digits: 23 | **06 points** | |
| **Problem 10** | **Write a C++ program with minimal possible number of lines of code that reads in 10 integers from the user, finds and prints out their average and the largest integer among those entered by the user. You can use a maximum of up-to 4 variables.**  **Your Code** | **06 points** | |