Engr 123   **April 23, 2018**
Final Exam Review

Final Exam is Monday April 30, 2018 at 8:00am

1. Given below is part of the definition of the Pt class. Give two examples of how the
two constructors might be used in a main program.

_____

_____

```
public class Pt
{
        private double r;
        private double theta;
        private double x;
        private double y;

        public Pt()
          {SetRTheta(0, 0);
           SetXY(0, 0);
                }
        public Pt(double rValue, double thetaValue)
          {SetRTheta(rValue, thetaValue*Math.PI/180);
           SetXY(rValue, thetaValue*Math.PI/180);
          }
          ....
        }
```

2. Write a method which will accept an an int array called a and will return the largest difference
between any two adjacent elements. For example, the following sequence will print 4 since the
largest difference is 7 − 3 = 4.
```
int[] a = {1, 1, 3, 7, 8, 9};
ConsoleWriteline(FindMaxDiff(a));
```

3. Write a method to reverse the elements in an array. For example, the following sequence
would return the array a reversed as shown.
```
int[] a = {9, 6, 4, 8, 2};
Reverse(a);

// a becomes {2, 8, 4, 6, 9}
```

4. Write a program in C# which has a user interface similar to that pictured below. There are two buttons labeled "Average" and "Enter Price", a text box, and a blank label. The user will enter prices into the text box and each time a price is entered she will click on the "Enter Price" button. When she clicks on the "Average" button your program should display the average of all of the prices entered on the label.

5. Consider the following class definition for the class *Stuff*.

A) Write a typical main program statement that would define a variable called myFirst as type stuff and make use of the first constructor in the class definition.

B) Write a typical main program statement that would define a variable called mySecond as type stuff and make use of the second constructor in the class definition.

C) Write a third constructor for the class which will make use of the following line in a main program.

```
Stuff yourStuff = new Stuff(5, 6);
```

```csharp
using System;
namespace Ex3
  {public class Stuff
       {private int a;
        private int b;
        private string s;
        public Stuff()
          {a = 0;
           b = 1;
           s = "";
          }
        public Stuff(int x, int y, string z)
          {a = x;
           b = y;
           s = z;
          }
        public void PrintStuff()
          {string sTmp;
           sTmp = "a = " + a.ToString();
           sTmp = "\nb = " + b.ToString();
           sTmp = "\nc = " + s;
          }
       }
  }
```

6. The program segment below uses a *switch* structure. Answer the following questions:
    A) What does the program print if the number entered is a 9? _____
    B) What does the program print if the number entered is a 0? _____
    C) What does the program print if the number entered is a 3? _____
    D) What does the program print if the number entered is a 1? _____
    E) What does the program print if the number entered is a -8? _____

```
{int in, j = 2;
 string inStr;
 Console.WriteLine("Enter an integer...");
 Console.ReadLine(inStr);
 in = Int32.Parse(inStr);
     switch (in)
       {case 0:
            j = 4;
            Console.WriteLine(j + in);
            break;
        case 1:
        case 2:
        case 3:
            Console.WriteLine(In * In);
            break;
        case 4:
            Console.WriteLine(In + j);
            break;
        case 9:
            Console.WriteLine(j * j);
            break;
        default:
            Console.WriteLine("Illegal number");
            break;
       }
  return 0;
 }
```

7. Write a program to evaluate the equation $y = x^3 - 4x^2 + 3x + 1$ for successive values of x beginning at 0 and ending when y is greater than 1000. Use step of 0.1 for the x increment. Print all values of y.

8. Write a C# console program implementation to input a sequence of positive integers from the keyboard and print their average. The number of integers to be entered is unknown but the last integer will be a 0. Your program should prompt the user to enter an integer. If the integer is nonzero it should be part of the average but nothing should be printed except a prompt for another integer. This procedure should continue until the user enters a zero at which time your program should print the average of the numbers with the appropriate message.

9. A two dimensional array is created by the statement given below. Assume that the array has been filled with data. Write a sequence to determine the sum of the two diagonal elements of the array.
```
int [,] dArr = new int[50, 50];
```

10. Assume that you have a string of length 10 which has some mix of letters and *
characters. The * and letter characters are randomly mixed within the string and you
don't know how many of each there are. Write a method which will accept two 10-letter
strings as arguments. The first argument is a string that was input by a user. The second
argument is the string with the randomly scattered stars. Your method should return the
user's string with the * characters in it in the same place as the starred string. For
example, if the two arguments are "abcdefghij" and "ei*ei*o***" your method should
return ab*de*g***".

11. Write a method which accepts two doubles, x and y as arguments and returns a
double. Your method should evaluate the equation $f(x, y) = xy + (x - |y|)^3$ and return the
value of this equation only if it is greater than 0. Otherwise, return -1.

12. Given below is a C# program that declares a class variable called "Pickles".
   A) The main code declares variables b1 and b2 as type Pickles with parameters.
      Write the class definition and the appropriate constructor. The Pickles class
      should have two private variables named x and y which are ints.
   B) The main code uses a print function to print the private variables of the class.
      Write the print function as part of the class.

```
static void Main(string[] args)
   {Pickles b1 = new Pickles(3, 4);
    Pickles b2 = new Pickles(5, 6);
    b1.Print();
   }
```

13. This problem has a Windows form which has two list boxes named lstBox1 and
lstBox2, a text box (in the middle) named txtBox1, and a button named btnEnter. Write
the btnEnter handler so that the user can enter integers into the text box and the enter
button will place them in txtBox1 if they are even, txtBox2 if they are odd, and ignore
them if they are zero or negative. When the user enters the number 1234 in the text box
the program should print the sum of each list box in the appropriate list box.
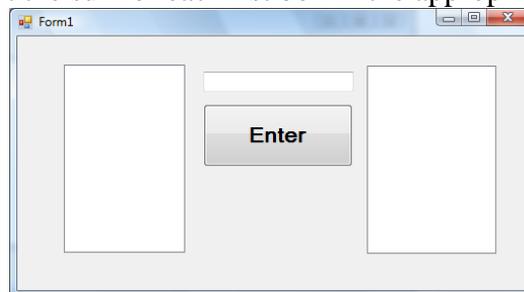

```
private void btnEnter_Click(object sender, EventArgs e)
   {
```