Engr 123 **Name______________________**
Hour Exam 2 **February 22, 2017**

1. The following sequence creates a 2-dimensional array of ints and fills it with data. In the space below fill in the correct values that will be in the array after the program runs.

```
  {int[,] a = {{1, 2}, {3, 4}, {4, 3}, {2, 1}};
   int r, c.;
   for(c=0;c<2;c++)
     {for(r=0;r<4;r++)
       {if(a[r,c] == 1)
          a[r,c] = 0;
        else
          a[r,c] = r + c + 2;
       }
     }
  }
```


2. Write a method which accepts two 1-dimensional int arrays named *a* and *b*. The method should check if *a* and *b* are the same length. If they are not, it should return false. If *a* is the same length as *b*, the method should swap array *a* with array *b* and return true. A sample calling statement is shown in the sequence below:

```
if(SwapArrays(a, b))
   Console.Writeline("Arrays swapped.");
```

3. If an array is defined by the statement `int [] a = new int[30];` , answer the following questions:

A) How many integers can be stored in the array? ________

B) Write a statement to store the number 54 in the last element of the array.

C) If the user write the statement below, what are the possible results? Explain.

```
a[34] = 22;
```

D) Write a short sequence of statements to exchange the values in element `A[12]` with the value in `a[11]`.

4. By default, arrays are passed to methods by *reference*. Why does this save memory space?

5. Mark each statement *A* to *D* below as true or false. The statement apply after the following code fragment runs.

```
int [] x = {9, 8, 7, 6};      //line 1
int [] y = {12, 15, 4, 3};    //line 2
x[2] = 4;                     //line 3
y[0] = x[3];                  //line 4
x[y[3]] = 12;                 //line 5
```

A) line 5 is illegal _____________
B) x[1] = 8 _____________
C) y[3] = 4 _____________
D) y[0] = 9 _____________

6. The following code creates a 2D array and calls a method *FillRandom* to fill the array with random numbers in the range $3 \le x \le 9$. Write the method.

```
int [,]a = new int[3, 500];
FillRandom(a);
```

7. In the code sequence below two arrays have been declared. Write the additional lines to copy the 3rd row of array a into array b.

```
int [,] a = new int a[7,6];
int []b = new int b[6];
...
// Assume code here fills a with data.
...
// Put your code below
```

8. Write an equivalent *for* loop for the *while* loop shown below.

```
int i = 7;
while(i > -3)
  {Console.WriteLine(i+4);
   i--;
  }
```

9. Write an equivalent *while* loop for the *for* loop shown below.

```
int i;
for(i=12;i>2;i=i-2)
  {Console.Writeline(i-1);
  }
```

10. The following method does a *Select sort* on a parameter named *arr*. Line numbers have been added to the left for reference purposes. Answer the questions below with regard to this method.

```
1  private static void SelectSort(int [] arr)
2  {int i, j, tmp, minIndx;
3   for(i=0;i<arr.Length-1;i++)
4     {for(j=i;j<arr.Length;j++)
5        {FindMin(arr, i, out minIndx);
6         tmp = arr[i];
7         arr[i] = arr[minIndx);
8         arr[minIndx] = tmp;
9        }
10    }
11 }
12 private void FindMin(int [] data, int start, out int minIndx)
13   {int i;
14    minIndx = start;
15    for(i=start;i<data.Length;i++)
16      {if(data[i] < data[minIndx])
17          minIndx = i;
18      }
19   }
```

A) What will be in the array x if we execute the following two statements?

```
   int [] x = {2, 8, 10, 6, 4};
   SelectionSort(x);
```

B) Does the Sort program still work correctly if two entries of the array it is sorting have the same value? For example:

```
   int [] y = {2, 8, 10, 8, 4};
   SelectionSort(y);
```

Explain why or why not?

C) Show how you could use the FindMin method to find and print the minimum of the array given by

```
      int [] z = {2, 8, 10, 6, 4, 0, -6, 15};
```

Engr 123
Hour Exam 2
Practical In Class

Name________________
February 22, 2017

1. Write a method which receives a 1-dimensional array named a[] and returns the index of the first nonzero element in the array. If there are no nonzero elements in the array your method should return -1. You can use the sample main program below to test your method. Your method should work for any integer 1-D array – not just the one in the main program below.

```
static void Main(string[] args)
    {int [] a = {0, 0, 0, 1, 2, 3, 4, 5};
     Console.WriteLine(MyMethod(a));
    }
```