

1. Show what is in the array *a* after the following sequence runs.

```
int [] a = {10, 13, 15, 3, 6, 22};
int i;
for(i=1;i<a.Length;i++)
    {if(a[i] > 5)
        a[i] = a[i-1];
    }
```

2. What is the difference between the terms *ref* and *out* with respect to passing arguments to methods in C#?

3. What is meant by the term *method overloading*? Give an example.

4. Show what is printed by the statements below. Mark "error" for any print statement that will produce an error. Use the same array definition for all problems. For those items which cause an error give a short explanation of what the error is.

```
int [,] d2 = {{9, 10, 11, 12},
              {4, 6, 8, 9},
              {7, 3, 2, 2}
            }
Console.WriteLine(d2[0]); _____
Console.WriteLine(d2[0,1]); _____
Console.WriteLine(d2[1,0]); _____
Console.WriteLine(d2[3,3]); _____
Console.WriteLine(d2[2,2]); _____
Console.WriteLine(d2[4,1]); _____
```

5. Write a function which will accept a single integer value as an argument and return the Boolean value of TRUE if and only if the integer is greater than 1000, otherwise return FALSE. You do not have to write a main program. Name your function TooBig.

6. The program segment below runs in a console application. Complete the memory map for the program and show what is printed.

```

static void Main(string[] args)
{
    int x, y, z;
    x = 12; y = 24;
    z = M1(ref x);
    Console.WriteLine("{0} {1} {2}", x, y, z);
    z = M2(y);
    Console.WriteLine("{0} {1} {2}", x, y, z);
}

static int M1(ref int x)
{
    x = x - 4;
    return 3 * x;
}
static int M2(int y)
{
    y = y + 9;
    return y;
}

```

Memory address			
M2	M1	Main	Data

IstData

7. The following statements creates an array and fills it with random numbers. Write a sequence to find and print the *array index* of the item which has the least absolute value in the array. The absolute value function is in the math library as `Math.Abs()`

```

static void Main(string[] args)
{
    Random rand = new Random();
    int [] a = new int[203];
    int i;
    for(i=0;i<203;i++)
        a[i] = rand.Next(-12, 13);
}

```

8. The following method does a Bubble 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 void Sort(int[] arr)
2     {bool flag = false;
3       int i, j, k, iTmp;
4       while(flag == false)
5         {flag = true;
6           for(i=0;i<arr.length - 1;i++)
7             {j = arr[i];
8               k = arr[i+1];
9               if(j > k)
10                {iTmp = arr[i];
11                  arr[i] = arr[i+1];
12                  arr[i+1] = iTmp;
13                  flag = false;
14                }
15              }
16            }
17          }
```

A) What function do lines 10, 11, and 12 perform?

B) What is the minimum number of times that the while loop beginning in line 4 will run. Consider all cases including the case where `arr` is already sorted. Justify and explain your answer.

C) If `arr` has just 3 elements what is the maximum number of times the while loop beginning in line 4 will run. Justify and explain your answer.

D) What is the purpose of the boolean variable `flag`?

9. Write a program to do the following:

A) Create a linear array of integers with 1000 elements and fill it with random numbers on the interval $0 \leq \text{number} < 100$.

B) Create a second linear array of doubles with 100 elements. Each element in this array should contain the *average* of 10 elements in the first array. For example, if the first array is name First[] and the second array is named Second[], then Second[0] should equal the average of First[0] to First[9], Second[1] should contain the average of First[10] to First[19], etc. Your program should print the contents of the second array in a column.

Engr 123
Hour Exam 2
Practical In Class

Name _____
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1. Write a method which receives a 1-dimensional array named `a[]` and returns the number of elements in the array that are less than zero. If there are no negative 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, -4, -9, 1, 2, -3, 4, 5};
  Console.WriteLine(MyMethod(a));
}
```