02/01/13 APCS – Monta Vista High School Search, Exceptions, Numbers, Review Name_____

1. Consider the following list of **char**s, sorted in order, least to greatest. Perform a Binary Search for the indicated value, showing your work clearly (just as we covered it in class). Determine the **number of steps** and the **value returned**.
Search for 'm'

0	1	2	3	4	5	6	7	8	9	10	11	12	13
'a'	'c'	'f'	'h'	'k'	'm'	'n'	'p'	'r'	's'	'u'	'w'	'x'	'z'

2. Consider the following list of **int**s, sorted in order, least to greatest. Perform a Binary Search for the indicated value, showing your work clearly (just as we covered it in class). Determine the **number of steps** and the **value returned**.
Search for 51

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
-23	-15	-3	7	21	24	28	33	39	45	51	63	71	85	87

3. Consider the following list of **double**s, sorted in order. Perform a Binary Search for the indicated value, showing your work clearly (just as we covered it in class). Determine the **number of steps** and the **value returned**.
Search for 2.6

0	1	2	3	4	5	6	7	8	9	10	11	12	13
5.6	11.4	15.1	29.8	31.6	33.8	38.4	42.2	47.0	54.7	58.6	61.5	72.3	88.4

4. Consider an array of 800 (sorted) **int**s. Assume that we apply binary search algorithm to this array, looking for an element that exists in the array. What is the maximum number of steps that it can take to find this element?

5. Consider an array of 1100 (sorted) **String**s. Assume that we apply a binary search algorithm to this array, looking for an element that does not exist in the array. What is the maximum number of steps that it can take to determine that this element does not exist in the list?

Problems 6 - 8. Given the following numbers in the given base, convert the number to the indicated bases.

6. Convert 1079_{10} (a decimal number) to both a binary (base 2) and octal (base 8) number

7. Convert 1011110101_2 (a binary number) to both a decimal (base 10) and hexadecimal (base 16) number

8. Convert $3BE_{16}$ (a hexadecimal number) to both a decimal (base 10) and binary (base 2) number

9. What keyword is used to specify that a data member is a **class** data member (shared among all instances of that class)?

(A) **final**
(B) **shared**
(C) **public**
(D) **static**
(E) **protected**

10. What is the output of the following code fragment?

```
try
{
        int num = Integer.parseInt("four thousand two hundred and ninety-five");
        System.out.println("Your number is: " + num + ".");
}
catch (NumberFormatException n)
{
        System.out.println("You don't have a number.");
}
catch (Exception e)
{
        System.out.println("Something went terribly terribly wrong.");
}
finally
{
        System.out.println("Number parsed successfully!");
}
```

(A)
You don't have a number.
Number parsed successfully!

(B)
Something went terribly terribly wrong.
Number parsed successfully!

(C)
Your number is: 4295.
Number parsed successfully!

(D)
Number parsed successfully!

(E)
You don't have a number.

11. Which of the following is **TRUE**?

(A) Multiple **catch** blocks should be listed in the order from general exception classes to more specialized ones.
(B) If there is no exception, the **finally** block will not be executed.
(C) If there are multiple **catch** blocks, only the first one matching the exception will be executed.
(D) If there are multiple **catch** blocks, all blocks that match the exception will be executed.
(E) Multiple **catch** blocks are not allowed in java.

12. Which of the following is **NOT** a key component of object oriented programming?

(A) **Inheritance**
(B) **Encapsulation**
(C) **Polymorphism**
(D) **objects**
(E) **Parallelism**

13. Consider the following class:

```
public class TestSample
{
        private ArrayList<Integer> samples;

        public TestSample (int n)
        {
                for(int k = 0; k < n; k++)
                {
                        samples.add(k);
                }
        }

        public double getBestRatio ( )
        {
                double maxRatio = samples.get(1).intValue() / samples.get(0).intValue();

                for(int k = 1; k < samples.size() - 1; k++)
                {
                        double ratio = samples.get(k+1).intValue() / samples.get(k).intValue();
                        if (ratio > maxRatio)
                        {
                                maxRatio = ratio;
                        }
                }
                return maxRatio;
        }
}
```

What is the result of the following code segment?

```
TestSample test = new TestSample(1);
System.out.println(test.getBestRatio());
```

(A) **NullPointerException**
(B) **ArithmeticException**
(C) **IndexOutOfBoundsException**
(D) **ClassCastException**
(E) **Infinity**

14. Which of the following initializes an 8 x 10 matrix with integer values that are perfect squares? Recall that **0** is a perfect square!

I.
```
int [][] matrix = new int[8][10];
```

II.
```
int [][] matrix = new int[8][10];
for(int r = 0; r < matrix.length; r++)
{
        for(int c = 0; c < matrix[r].length; c++)
        {
                matrix[r][c] = r * r;
        }
}
```

III.
```
int [][] matrix = new int[8][10];
for(int c = 0; c < matrix[r].length; c++)
{
        for(int r = 0; r < matrix.length; r++)
        {
                matrix[r][c] = c * c;
        }
}
```

(A) **I** only
(B) **II** only
(C) **III** only
(D) **I** and **II** only
(E) **I**, **II**, and **III**

15. Bonus Question (you can skip this one; it's worth a piece of candy, and it doesn't count toward your grade!)

Why do computer scientists always confuse Halloween and Christmas?

16. Free Response Question