AP Computer Science Midterm Review Part 1

1. Consider the following method

```
public void process(String s)
{
       s = s.substring(2, 3) + s.substring(1, 2) +
       s.substring(0, 1);
}
```

What is printed as a result of executing the following statements (in a method in the same class)?

```
String s = "ABCD";
process(s);
System.out.println(s);
```

(A) ABCD
(B) CBA
(C) CDBCA
(D) CDBCAB
(E) IndexOutOfBoundsException

Answer: A

2. Which of the following statements will result in a syntax error?

(A) String x = "123";
(B) Integer x = "123";
(C) Object x = "123";
(D) String[ ] x = {"123"};
(E) All of the above will compile with no errors.

Answer: B

3. What is printed as a result of executing the following statements?

```
double x = 2.5,   y = 1.99;
System.out.println((int)(x/y) + (int)(x*y));
```

(A) 0
(B) 3
(C) 4
(D) 4.0
(E) 5

Answer: E

4. What is the result when the following code segment is compiled and executed?

```
int m = 4,   n = 5;
```

```
        double d = Math.sqrt((m + n)/2);
        System.out.println(d);
```

(A) Syntax error "sqrt(double) in java.lang.Math cannot be applied to int"
(B) `1.5` is displayed
(C) `2.0` is displayed
(D) `2.1213203435596424` is displayed
(E) `ArithmeticException`

Answer: C

5. For which of the following pairs of values a and b does the expression

```
        (a > 20 && a < b) || (a > 10 && a > b)
```

evaluate to `true`?

(A) `5` and `0`
(B) `5` and `10`
(C) `15` and `10`
(D) `15` and `20`
(E) None of the above

Answer: C

6. Which of the following methods are equivalent (always return the same value for the same values of input parameters)?

```
    I.      public boolean fun(int a, int b, int c)
            {
                if (a >= b)
                    if (b >= c)
                        return true;
                    else
                        return false;
                else
                    retuen false;
            }
```

```
    II.     public boolean fun(int a, int b, int c)
            {
                if (a >= b && b >= c)
                    return true;
                else
                    retuen false;
            }
```

```
    III.    public boolean fun(int a, int b, int c)
            {
```

```
                    return a >= b || b >= c;
        }
```

(A) I and II only
(B) I and III only
(C) II and III only
(D) All three are equivalent
(E) All three are different

Answer: A

7. Consider the following code segment.

```
        int[ ] nums = new int[51];

        for (int k = 0; k < nums.length; k++)
            nums[k] = 1;

        for (int k = 3; k <= 50; k += 3)
            nums[k] = 0;

        for (int k = 5; k <= 50; k += 5)
            nums[k] = 0;
```

How many elements in the array nums have the value 0 after this code has been executed?

(A) 23
(B) 25
(C) 26
(D) 27
(E) 28

Answer: A

8. What are the contents of the array nums after the following code segment has been executed?

```
        int[ ] nums = new int[8];
        nums[0] = 0;
        int n = 1;
        while (n < nums.length)
        {
            int k;
            for (k = n; k < 2*n; k++)
                nums[k] = nums[k - n] + 1;
            n = k;
        }
```

How many elements in the array nums have the value 0 after this code has been executed?

(A) 0 1 1 1 1 1 1 1
(B) 0 1 0 1 0 1 0 1
(C) 0 1 1 2 1 2 2 3
(D) 0 1 2 3 1 2 3 4
(E) 0 1 2 3 4 5 6 7

Answer: C

9. Consider the following method.

```
private int swap(int a, int b)
{
        if (a < b)
        {
                b = a;
                a = b;
        }
        return b - a;
}
```

What are the values of the variables a, b, and c after the following statements are executed?

```
int a =2, b = 5;
int c = swap(a, b);
```

(A) 2, 5, 0
(B) 2, 5, 3
(C) 2, 5, -3
(D) 2, 2, 0
(E) 5 2 3

Answer: A

10. Consider the following method.

```
public int countSomething(int[ ] arr)
{
        int m = arr[0];
        int count = 1;
        for (int k = 1; k < arr.length; k++)
        {
                int a = arr[k];
                if (a > m)
                {
                        m = a;
                        count = 1;
                }
                else if (m == a)
                        count++;
        }
        return count:
}
```

(A) int[ ] arr = {0, 1, 1, 1, 1};
(B) int[ ] arr = {1, 6, 5, 4, 0};
(C) int[ ] arr = {1, 0, 5, 6, 1};
(D) int[ ] arr = {3, 2, 1, 0, 5};
(E) None of the above

Answer: E

11. What is printed when the following code segment is executed?

```
String[ ] xy = {"X", "Y"};
String[ ] yx = xy;
yx[0] = xy[1];
yx[1] = xy[0];
System.out.println(xy[0] + xy[1] + yx[0] + yx[1]);
```

(A) XXXX
(B) XYYX
(C) XYXY
(D) XYYY
(E) YYYY

Answer: E

12. What is the output from the following code segment?

```
ArrayList<String> cities = new ArrayList<String>( );
cities.add("Atlanta");
cities.add("Boston");
cities.add("Chicago");
for(String city : cities)
        city = city.substring(1);
System.out.println(cities);
```

(A) [A, B, C]
(B) [C, B, A]
(C) [a, n, o]
(D) [tlanta, oston, hicago]
(E) [Atlanta, Boston, Chicago]

Answer: E

13. What is the output of the following program segment?

```
int num = 5;
while (num >= 0)
{
        num -= 2;
}
System.out.print(num);
```

(A) -2
(B) -1
(C) 0
(D) 2
(E) 21

Answer: B

14. What is the output from

```
int n = 12;
System.out.print(goFigure(n));
System.out.print(" " + n);
```

Where the method `goFigure` is defined as follows:

```
public double doFigure(int n)
{
    n %= 7;
    return (double)(12 /n);
}
```

(A) `2.0  12`
(B) `2.4  12`
(C) `2.0  5`
(D) `2.4  5`
(E) `2.4  6`

Answer: A

15. Which of the following expressions will evaluate to `true` when x and y are `boolean` variables with different values?

```
I.    (x || y) && (!x || !y)
II.   (x || y) && !(x || y)
III.  (x || !y) || (!x || y)
```

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

Answer: E

16. What is the output from the following code segment?

```
double x = 5*4/2 - 5/2*4;
System.out.println(x);
```

(A) `0`
(B) `1`
(C) `0.0`
(D) `1.0`
(E) `2.0`

Answer: E

17. What is the output from the following code segment?

```
String band = "anamanaguchi";
System.out.println(band.substring(1, 4).compareTo(band.substring(5, 8)));
```

(A) `true`
(B) `false`
(C) `0`
(D) A negative integer
(E) A positive integer

Answer: E

18. What will array `arr` contain after the following code segment has been executed?

```
int[ ] arr = {4, 3, 2, 1, 0};
for (int k = 1; k < arr.length; k++)
{
      arr[k - 1] += arr[k];
}
```

(A) `4, 7, 5, 3, 1`
(B) `4, 7, 9, 10, 10`
(C) `7, 5, 3, 1, 0`
(D) `7, 3, 2, 1, 0`
(E) `10, 6, 3, 1, 0`

Answer: C

19. The code fragment

```
int x = < an integer value >;
System.out.println(x*x);
```

displays `-131071`. Which of the following is a possible value of `x`?

(A) `-1`
(B) $2^{15} + 1$
(C) $2^{16} - 1$
(D) $2^{32} + 1$
(E) No such value exists

Answer: C

20. What is the output of the following code segment?

```
List<Integer> list = new ArrayList<Integer>( );
nums = Test.doNothing(nums);

for (int i = 1; i <= 8; i++)
{
      list.add(new Integer(i));
```

```
        }

        for (int i = 0; I < list.size( ); i++)
        {
              list.remove(i);
        }

        for (Integer x : list)
        {
              System.out.print(x + " ");
        }
```

(A) IndexOutOfBoundsException
(B) No output because the resulting list is empty
(C) 1 3 5 7
(D) 2 4 6 8
(E) 1 2 3 4 5 6 7 8

Answer: D

21. Consider the following method.

```
        public void change(double[ ] nums, int n)
        {
              for (int k = 0; k < n; k++)
              {
                    nums[k] = 5.4;
              }
              n = 2;
        }
```

What will be stored in samples and len after the following statements are executed?

```
        double[ ] samples = {1.0, 2.1, 3.2, 4.3};
        int len = samples.length;
        change(samples, len);
```

(A) samples contains 5.4, 5.4, 5.4, 5.4; len is 4
(B) samples contains 5.4, 5.4, 5.4, 5.4; len is 2
(C) samples contains 1.0, 2.1, 3.2, 4.3; len is 4
(D) samples contains 5.4, 5.4; len is 2
(E) samples contains 1.0, 2.1; len is 2

Answer: A

22. Consider the following code segment.

```
        List<String> list = new ArrayList<String>( );
        list.add("A");
        list.add("B");
        list.add("C");

        for (String s : list)
        {
              String t = list.get(list.size( ) - 1);
```

```
            list.set(list.size( ) - 1, s);
            s = t;
        }
```

What will `list` contain after the above code segment has been executed?

(A) ["A", "B", "C"]
(B) ["A", "B", "B"]
(C) ["C", "B", "A"]
(D) ["C", "A", "B"]
(E) ["C", "C", "C"]

Answer: B

23. Consider the following class.

```
    public class Counter
    {
        private int count = 0;

        public Counter( ) { count = 0; }
        public Counter(int x) { count = x; }                // Line 1
        public int getCount( ) { return count; }            // Line 2
        public void setCount(int c) { int count = c; }      // Line 3
        public void increment( ) { count++; }               // Line 4
        public String toString( ) { return "" + count; }    // Line 5

    }
```

The test code

```
            Counter c = new Counter( );
            c.setCount(3);
            c.increment( );
            System.out.println(c.getCount( ));
```

is supposed to print 4, but the class has an error.   What is actually printed, and which line in the class definition should be changed to get the correct output, 4?

(A) 0, Line 1
(B) 1, Line 3
(C) 0, Line 4
(D) 3, Line 4
(E) 36, Line 5

Answer: B

24. Given the declarations

```
int p = 5, q = 3;
```

which of the following expressions evaluate to 7.5?

   I.   `(double)p * (double)q / 2;`
   II.   `(double)p * (double)(q / 2);`
   III. `(double)(p * q / 2);`

(A) I only
(B) II only
(C) I and II only
(D) I, II, and III
(E) None of them

Answer: A

25. Consider the following method `fun2`.

```
public int fun2(int x, int y)
{
        y -= x;
        return y;
}
```

What are the values of the variables `a` and `b` after the following code is executed?

```
int a = 3, b = 7;
b = fun2(a, b);
a = fun2(b, a);
```

(A) −1 and 4
(B) −4 and 7
(C) −4 and 4
(D) 3 and 7
(E) 3 and 4

Answer: A