U1-4_4   Name _____

1. Consider the following method.

```
public String mystery(String input)
{
    String output = "";

    for (int k = 1; k < input.length(); k = k + 2)
    {
        output += input.substring(k, k + 1);
    }

    return output;
}
```

What is returned as a result of the call mystery("computer") ?

(A) "computer"

(B) "cmue"

(C) "optr"

(D) "ompute"

(E) Nothing is returned because an IndexOutOfBoundsException is thrown.

2. Consider the following method.

```
public static String scramble(String word, int howFar)
{
    return word.substring(howFar + 1, word.length()) +
            word.substring(0, howFar);
}
```

What value is returned as a result of the call scramble("compiler", 3)?

(A) "compiler"

(B) "pilercom"

(C) "ilercom"

(D) "ilercomp"

(E) No value is returned because an IndexOutOfBoundsException will be thrown.

3. Consider the following method.

```
public static boolean mystery(String str)
{
    String temp = "";

    for (int k = str.length(); k > 0; k--)
    {
        temp = temp + str.substring(k - 1, k);
    }

    return temp.equals(str);
}
```

Which of the following calls to mystery will return true?

(A) mystery ("no")

(B) mystery ("on")

(C) mystery ("nnoo")

(D) mystery ("nono")

(E) mystery ("noon")

4. Consider the following method.

```
//* Precondition: num > 0 */
public static int doWhat(int num)
{
  int var = 0;

  for (int loop = 1; loop <= num; loop = loop + 2)
  {
    var += loop;
  }

  return var;
}
```

Which of the following best describes the value returned from a call to doWhat ?

(A) num

(B) The sum of all integers between 1 and num, inclusive

(C) The sum of all even integers between 1 and num, inclusive

(D) The sum of all odd integers between 1 and num, inclusive

(E) No value is returned because of an infinite loop.

5. Consider the following method.

```
public int compute(int n, int k)
{
  int answer = 1;

  for (int i = 1; i <= k; i++)
    answer *= n;

  return answer;
}
```

Which of the following represents the value returned as a result of the call compute (n, k) ?

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(A) n*k

(B) n!

(C) n^k

(D) 2^k

(E) k^n

6. Consider the following method.

```
public void test(int x)
{
   int y;

   if (x % 2 == 0)
      y = 3;
   else if (x > 9)
      y = 5;
   else
      y = 1;

   System.out.println("y = " + y);
}
```

Which of the following test data sets would test each possible output for the method?

A) 8, 9, 12

B) 7, 9, 11

C) 8, 9, 11

D) 8, 11, 13

E) 7, 9, 10

---

7. Consider the following output.

```
1   1   1   1   1
2   2   2   2
3   3   3
4   4
5
```

Which of the following code segments will produce this output?

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A
```
for (int j = 1; j <= 5; j++)
{
  for (int k = 1; k <= 5; k++)
  {
    System.out.print(j + "  ");
  }
  System.out.println();
}
```

B
```
for (int j = 1; j <= 5; j++)
{
  for (int k = 1; k <= j; k++)
  {
    System.out.print(j + "  ");
  }
  System.out.println();
}
```

C
```
for (int j = 1; j <= 5; j++)
{
  for (int k = 5; k >= 1; k--)
  {
    System.out.print(j + "  ");
  }
  System.out.println();
}
```

D
```
for (int j = 1; j <= 5; j++)
{
  for (int k = 5; k >= j; k--)
  {
    System.out.print(j + "  ");
  }
  System.out.println();
}
```

E
```
for (int j = 1; j <= 5; j++)
{
  for (int k = j; k <= 5; k++)
  {
    System.out.print(k + "  ");
  }
  System.out.println();
}
```

8. Consider the following code segment.

```
int num = 1;
int count = 0;
while (num <= 10)
{
if (num % 2 == 0 && num % 3 == 0)
{
count++;
}
num++;
}
```

What value is stored in the variable count as a result of executing the code segment?

(A) 1

(B) 3

(C) 5

(D) 7

(E) 8

9. Consider the following code segment.

```
String str = "a black cat sat on a table";
int counter = 0;
for (int i = 0; i < str.length() - 1; i++)
{
if (str.substring(i, i + 1).equals("a") &&
   !str.substring(i + 1, i + 2).equals("b"))
{
counter++;
}
}
System.out.println(counter);
```

What is printed as a result of executing this code segment?

(A) 1

(B) 2

(C) 3

(D) 5

(E) 6

10. Consider the following code segment.

```
int x = 5;
int y = 6;
/* missing code */
z = (x + y) / 2;
```

Which of the following can be used to replace /* *missing code* */ so that the code segment will compile?

1. int z = 0;
2. int z;
3. boolean z = false;

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(A)   I only

(B)   II only

(C)   I and II only

(D)   II and III only

(E)   I, II, and III

---

11. A code segment (not shown) is intended to determine the number of players whose average score in a game exceeds 0.5. A player's average score is stored in avgScore, and the number of players who meet the criterion is stored in the variable count.

Which of the following pairs of declarations is most appropriate for the code segment described?

(A)   double avgScore;
       boolean count;

(B)   double avgScore;
       double count;

(C)   double avgScore;
       int count;

(D)   int avgScore;
       boolean count;

(E)   int avgScore;
       int count;

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12. The Student class has been defined to store and manipulate grades for an individual student. The following methods have been defined for the class.

/* Returns the sum of all of the student's grades */

public double sumOfGrades()

{ /* implementation not shown */ }

/* Returns the total number of grades the student has received */

public int numberOfGrades()

{ /* implementation not shown */ }

/* Returns the lowest grade the student has received */

public double lowestGrade()

{ /* implementation not shown */ }

Which of the following statements, if located in a method in the Student class, will determine the average of all of the student's grades except for the lowest grade and store the result in the double variable newAverage ?

(A) newAverage = sumOfGrades() / numberOfGrades() - 1;

(B) newAverage = sumOfGrades() / (numberOfGrades() - 1);

(C) newAverage = sumOfGrades() - lowestGrade() / (numberOfGrades() - 1);

(D) newAverage = (sumOfGrades() - lowestGrade()) / numberOfGrades() - 1;

(E) newAverage = (sumOfGrades() - lowestGrade()) / (numberOfGrades() - 1);

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13. Consider the following two code segments. Code segment II is a revision of code segment I in which the loop header has been changed.

I.
for (int k = 1; k <= 5; k++)
{
System.out.print(k);
}
II.
for (int k = 5; k >= 1; k--)
{
System.out.print(k);
}

Which of the following best explains how the output changes from code segment I to code segment II?

(A) Both code segments produce the same output, because they both iterate four times.

(B) Both code segments produce the same output, because they both iterate five times.

(C) Code segment I prints more values than code segment II does, because it iterates for one additional value of k.

(D) Code segment II prints more values than code segment I, because it iterates for one additional value of k.

(E) The code segments print the same values but in a different order, because code segment I iterates from 1 to 5 and code segment II iterates from 5 to 1.

14. Consider the following method.

```
public void doSomething()
{
System.out.println("Something has been done");
}
```

Each of the following statements appears in a method in the same class as doSomething. Which of the following statements are valid uses of the method doSomething ?

1. doSomething();
2. String output = doSomething();
3. System.out.println(doSomething());

(A) I only

(B) II only

(C) I and II only

(D) I and III only

(E) I, II, and III

15. Consider the following code segment.

```
String alpha = new String("APCS");
String beta = new String("APCS");
String delta = alpha;
System.out.println(alpha.equals(beta));
System.out.println(alpha == beta);
System.out.println(alpha == delta);
```

What is printed as a result of executing the code segment?

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(A) false
  false
  false

(B) false
  false
  true

(C) true
  false
  false

(D) true
  false
  true

(E) true
  true
  true

---

16. Assume that object references one, two, and three have been declared and instantiated to be of the same type. Assume also that one == two evaluates to true and that two.equals(three) evaluates to false.

Consider the following code segment.

```
if (one.equals(two))
{
System.out.println("one dot equals two");
}
if (one.equals(three))
{
System.out.println("one dot equals three");
}
if (two == three)
{
System.out.println("two equals equals three");
}
```

What, if anything, is printed as a result of executing the code segment?

(A) one dot equals two

(B) one dot equals two
one dot equals three

(C) one dot equals three
two equals equals three

(D) one dot equals two
one dot equals three
two equals equals three

(E) Nothing is printed.

17. Consider the following code segment.
    int count = 5;
    while (count < 100)
    {
    count = count * 2;
    }
    count = count + 1;
    What will be the value of count as a result of executing the code segment?

(A) 100

(B) 101

(C) 160

(D) 161

(E) 321
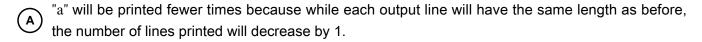
18. Consider the following code segment.
    double d1 = 10.0;
    Double d2 = 20.0;
    Double d3 = new Double(30.0);
    double d4 = new Double(40.0);

    System.out.println(d1 + d2 + d3.doubleValue() + d4);
    What, if anything, is printed when the code segment is executed?

Ⓐ 100.0

Ⓑ 10.050.040.0

Ⓒ 10.020.070.0

Ⓓ 10.020.030.040.0

Ⓔ There is no output due to a compilation error.

19. Consider the following code segment.
    for (int x = 0; x <= 4; x++)   // Line 1
    {
    for (int y = 0; y < 4; y++) // Line 3
    {
    System.out.print("a");
    }
    System.out.println();
    }
    Which of the following best explains the effect of simultaneously changing $x <= 4$ to $x < 4$ in line 1
    and $y < 4$ to $y <= 4$ in line 3 ?

(A) "a" will be printed fewer times because while each output line will have the same length as before, the number of lines printed will decrease by 1.

(B) "a" will be printed more times because while the number of output lines will be the same as before, the length of each output line will increase by 1.

(C) "a" will be printed the same number of times because while the number of output lines will decrease by 1, the length of each line will increase by 1.

(D) "a" will be printed more times because both the number of output lines and the length of each line will increase by 1.

(E) The output of the code segment will not change in any way.

---

20. Consider the following code segment.

```
if (a < b || c != d)
{
System.out.println("dog");
}
else
{
System.out.println("cat");
}
```

Assume that the int variables a, b, c, and d have been properly declared and initialized. Which of the following code segments produces the same output as the given code segment for all values of a, b, c, and d ?

(A)
```
if (a < b && c != d)
{
System.out.println("dog");
}
else
{
System.out.println("cat");
}
```

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B
```
if (a < b && c != d)
{
System.out.println("cat");
}
else
{
System.out.println("dog");
}
```

C
```
if (a > b && c == d)
{
System.out.println("cat");
}
else
{
System.out.println("dog");
}
```

D
```
if (a >= b || c == d)
{
System.out.println("cat");
}
else
{
System.out.println("dog");
}
```

E
```
if (a >= b && c == d)
{
System.out.println("cat");
}
else
{
System.out.println("dog");
}
```