1. Consider the following code segment.

```
int value = 15;
while (value < 28)
{
  System.out.println(value);
  value++;
}
```

What are the first and last numbers output by the code segment?

	First	Last
(A)	15	27
(B)	15	28
(C)	16	27
(D)	16	28
(E)	16	29

2. A teacher put three bonus questions on a test and awarded 5 extra points to anyone who answered all three bonus questions correctly and no extra points otherwise. Assume that the `boolean` variables `bonusOne`, `bonusTwo`, and `bonusThree` indicate whether a student has answered the particular question correctly. Each variable was assigned `true` if the answer was correct and `false` if the answer was incorrect.

   Which of the following code segments will properly update the variable `grade` based on a student's performance on the bonus questions?

   I.
```
if (bonusOne && bonusTwo && bonusThree)
  grade += 5;
```

   II.
```
if (bonusOne || bonusTwo || bonusThree)
  grade += 5;
```

   III.
```
if (bonusOne)
  grade += 5;
if (bonusTwo)
  grade += 5;
if (bonusThree)
  grade += 5;
```

   (A) I only

   (B) II only

   (C) III only

   (D) I and III

   (E) II and III

3. Assume that an array of integer values has been declared as follows and has been initialized.

```
int[] arr = new int[10];
```

Which of the following code segments correctly interchanges the value of `arr[0]` and `arr[5]` ?

(A)
```
arr[0] = 5;
arr[5] = 0;
```

(B)
```
arr[0] = arr[5];
arr[5] = arr[0];
```

(C)
```
int k = arr[5];
arr[0] = arr[5];
arr[5] = k;
```

(D)
```
int k = arr[0];
arr[0] = arr[5];
arr[5] = k;
```

(E)
```
int k = arr[5];
arr[5] = arr[0];
arr[0] = arr[5];
```

4. Consider the following code segment.

```
ArrayList<String> items = new ArrayList<String>();
items.add("A");
items.add("B");
items.add("C");
items.add(0, "D");
items.remove(3);
items.add(0, "E");
System.out.println(items);
```

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

(A) `[A, B, C, E]`

(B) `[A, B, D, E]`

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

(D) `[E, D, A, C]`

(E) `[E, D, C, B]`

---

5. When designing a class hierarchy, which of the following should be true of a superclass?

(A) A superclass should contain the data and functionality that are common to all subclasses that inherit from the superclass.

(B) A superclass should be the largest, most complex class from which all other subclasses are derived.

(C) A superclass should contain the data and functionality that are only required for the most complex class.

(D) A superclass should have public data in order to provide access for the entire class hierarchy.

(E) A superclass should contain the most specific details of the class hierarchy.

Questions 6-7 refer to the following code segment.

```
int k = a random number such that 1 ≤ k ≤ n ;

for (int p = 2; p <= k; p++)
  for (int r = 1; r < k; r++)
    System.out.println("Hello");
```

6. What is the minimum number of times that `Hello` will be printed?

(A) 0

(B) 1

(C) 2

(D) $n - 1$

(E) $n - 2$

---

7. What is the maximum number of times that `Hello` will be printed?

(A) 2

(B) $n - 1$

(C) $n - 2$

(D) $(n - 1)^2$

(E) n^2

8. Consider the following instance variable and incomplete method. The method `calcTotal` is intended to return the sum of all values in `vals`.

```
private int[] vals;

public int calcTotal()
{
  int total = 0;

  /* missing code */

  return total;
}
```

Which of the code segments shown below can be used to replace `/* missing code */` so that `calcTotal` will work as intended?

I.
```
for (int pos = 0; pos < vals.length; pos++)
{
  total += vals[pos];
}
```

II.
```
for (int pos = vals.length; pos > 0; pos--)
{
  total += vals[pos];
}
```

III.
```
int pos = 0;
while (pos < vals.length)
{
  total += vals[pos];
  pos++;
}
```

(A) I only

(B) II only

(C) III only

(D) I and III

(E) II and III

9. Consider the following code segment.

```
String str = "abcdef";
for (int rep = 0; rep < str.length() - 1; rep++)
{
  System.out.print(str.substring(rep, rep + 2));
}
```

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

(A) `abcdef`

(B) `aabbccddeeff`

(C) `abbccddeef`

(D) `abcbcdcdedef`

(E) Nothing is printed because an `IndexOutOfBoundsException` is thrown.

10. Consider the following method.

```
public void numberCheck(int maxNum)
{
  int typeA = 0;
  int typeB = 0;
  int typeC = 0;

  for (int k = 1; k <= maxNum; k++)
  {
    if (k % 2 == 0 && k % 5 == 0)
      typeA++;
    if (k % 2 == 0)
      typeB++;
    if (k % 5 == 0)
      typeC++;
  }

  System.out.println(typeA + " " + typeB + " " + typeC);
}
```

What is printed as a result of the call `numberCheck(50)` ?

(A) `5 20 5`

(B) `5 20 10`

(C) `5 25 5`

(D) `5 25 10`

(E) `30 25 10`

11. Consider the following method that is intended to modify its parameter `nameList` by replacing all occurrences of `name` with `newValue`.

```
public void replace(ArrayList<String> nameList,
                    String name, String newValue)
{
  for (int j = 0; j < nameList.size(); j++)
  {
    if ( /* expression */ )
    {
      nameList.set(j, newValue);
    }
  }
}
```

Which of the following can be used to replace `/* expression */` so that `replace` will work as intended?

(A) `nameList.get(j).equals(name)`

(B) `nameList.get(j) == name`

(C) `nameList.remove(j)`

(D) `nameList[j] == name`

(E) `nameList[j].equals(name)`

12. Consider the following incomplete method.

```
public int someProcess(int n)
{
  /* body of someProcess */
}
```

The following table shows several examples of input values and the results that should be produced by calling `someProcess`.

Input Value `n`	Value Returned by `someProcess(n)`
3	30
6	60
7	7
8	80
9	90
11	11
12	120
14	14
16	160

Which of the following code segments could be used to replace `/* body of someProcess */` so that the method will produce the results shown in the table?

I.
```
if ((n % 3 == 0) && (n % 4 == 0))
  return n * 10;
else
  return n;
```

II.
```
if ((n % 3 == 0) || (n % 4 == 0))
  return n * 10;

return n;
```

III.
```
if (n % 3 == 0)
  if (n % 4 == 0)
    return n * 10;

return n;
```

(A) I only

(B) II only

(C) III only

(D) I and III

(E) II and III

13. Consider the following method.

```
// precondition: x >= 0
public void mystery(int x)
{
  if ((x / 10) != 0)
  {
    mystery(x / 10);
  }

  System.out.print(x % 10);
}
```

Which of the following is printed as a result of the call `mystery(123456)` ?

(A) `16`

(B) `56`

(C) `123456`

(D) `654321`

(E) Many digits are printed due to infinite recursion.

14. Consider the following instance variables and incomplete method that are part of a class that represents an item. The variables `years` and `months` are used to represent the age of the item, and the value for `months` is always between 0 and 11, inclusive. Method `updateAge` is used to update these variables based on the parameter `extraMonths` that represents the number of months to be added to the age.

```
private int years;
private int months;   // 0 <= months <= 11

// precondition: extraMonths >= 0
public void updateAge(int extraMonths)
{
  /* body of updateAge */
}
```

Which of the following code segments could be used to replace `/* body of updateAge */` so that the method will work as intended?

```
I.   int yrs = extraMonths % 12;
     int mos = extraMonths / 12;
     years = years + yrs;
     months = months + mos;

II.  int totalMonths = years * 12 + months + extraMonths;
     years = totalMonths / 12;
     months = totalMonths % 12;

III. int totalMonths = months + extraMonths;
     years = years + totalMonths / 12;
     months = totalMonths % 12;
```

(A) I only

(B) II only

(C) III only

(D) II and III only

(E) I, II, and III

15. Consider the following method.

```
public String inRangeMessage(int value)
{
  if (value < 0 || value > 100)
    return "Not in range";
  else
    return "In range";
}
```

Consider the following code segments that could be used to replace the body of `inRangeMessage`.

I.
```
if (value < 0)
{
  if (value > 100)
    return "Not in range";
  else
    return "In range";
}
else
  return "In range";
```

II.
```
if (value < 0)
  return "Not in range";
else if (value > 100)
  return "Not in range";
else
  return "In range";
```

III.
```
if (value >= 0)
  return "In range";
else if (value <= 100)
  return "In range";
else
  return "Not in range";
```

Which of the replacements will have the same behavior as the original version of `inRangeMessage` ?

(A) I only

(B) II only

(C) III only

(D) I and III

(E) II and III

16. Consider the following class declaration.

```
public class SomeClass
{
  private int num;

  public SomeClass(int n)
  {
    num = n;
  }

  public void increment(int more)
  {
    num = num + more;
  }

  public int getNum()
  {
    return num;
  }
}
```

The following code segment appears in another class.

```
SomeClass one = new SomeClass(100);
SomeClass two = new SomeClass(100);
SomeClass three = one;

one.increment(200);

System.out.println(one.getNum() + "   " + two.getNum() + "   " +
                   three.getNum());
```

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

(A) `100   100   100`

(B) `300   100   100`

(C) `300   100   300`

(D) `300   300   100`

(E) `300   300   300`

17. The following incomplete method is intended to sort its array parameter `arr` in increasing order.

```
// postcondition: arr is sorted in increasing order
public static void sortArray(int[] arr)
{
  int j, k;

  for (j = arr.length - 1; j > 0; j--)
  {
    int pos = j;

    for ( /* missing code */ )
    {
      if (arr[k] > arr[pos])
      {
        pos = k;
      }
    }
    swap(arr, j, pos);
  }
}
```

Assume that `swap(arr, j, pos)` exchanges the values of `arr[j]` and `arr[pos]`. Which of the following could be used to replace `/* missing code */` so that executing the code segment sorts the values in array `arr` ?

(A) `k = j - 1; k > 0; k--`

(B) `k = j - 1; k >= 0; k--`

(C) `k = 1; k < arr.length; k++`

(D) `k = 1; k > arr.length; k++`

(E) `k = 0; k <= arr.length; k++`

18. Assume that `x` and `y` are `boolean` variables and have been properly initialized.

```
(x && y) || !(x && y)
```

The result of evaluating the expression above is best described as

(A) always `true`

(B) always `false`

(C) `true` only when `x` is `true` and `y` is `true`

(D) `true` only when `x` and `y` have the same value

(E) `true` only when `x` and `y` have different values

19. Assume that the following variable declarations have been made.

```
double d = Math.random();
double r;
```

Which of the following assigns a value to `r` from the uniform distribution over the range $0.5 \le r < 5.5$?

(A) `r = d + 0.5;`

(B) `r = d + 0.5 * 5.0;`

(C) `r = d * 5.0;`

(D) `r = d * 5.0 + 0.5;`

(E) `r = d * 5.5;`

20. Consider the following instance variables and method that appear in a class representing student information.

```
private int assignmentsCompleted;
private double testAverage;

public boolean isPassing()
{ /* implementation not shown */ }
```

A student can pass a programming course if at least one of the following conditions is met.

- The student has a test average that is greater than or equal to 90.
- The student has a test average that is greater than or equal to 75 and has at least 4 completed assignments.

Consider the following proposed implementations of the `isPassing` method.

```
I.   if (testAverage >= 90)
       return true;
     if (testAverage >= 75 && assignmentsCompleted >= 4)
       return true;
     return false;

II.  boolean pass = false;
     if (testAverage >= 90)
       pass = true;
     if (testAverage >= 75 && assignmentsCompleted >= 4)
       pass = true;
     return pass;

III. return (testAverage >= 90) ||
            (testAverage >= 75 && assignmentsCompleted >= 4);
```

Which of the implementations will correctly implement method `isPassing` ?

(A) I only

(B) II only

(C) I and III only

(D) II and III only

(E) I, II, and III

Questions 21-25 refer to the code from the GridWorld case study. A copy of the code is provided in the Appendix.

21. Consider the following code segment.

```
Location loc1 = new Location(3, 3);
Location loc2 = new Location(3, 2);

if (loc1.equals(loc2.getAdjacentLocation(Location.EAST)))
  System.out.print("aaa");

if (loc1.getRow() == loc2.getRow())
  System.out.print("XXX");

if (loc1.getDirectionToward(loc2) == Location.EAST)
  System.out.print("555");
```

What will be printed as a result of executing the code segment?

(A) `aaaXXX555`

(B) `aaaXXX`

(C) `XXX555`

(D) `555`

(E) `aaa`

22. A `RightTurningBug` behaves like a `Bug`, except that when it turns, it turns 90 degrees to the right. The declaration for the `RightTurningBug` class is as follows.

```
public class RightTurningBug extends Bug
{
  public void turn()
  {
    /* missing implementation */
  }
}
```

Consider the following suggested replacements for `/* missing implementation */`.

I.
```
int desiredDirection = (getDirection() + Location.RIGHT)
                        % Location.FULL_CIRCLE;

while (getDirection() != desiredDirection)
{
  super.turn();
}
```

II.
```
super.turn();
super.turn();
```

III.
```
setDirection(getDirection() + Location.RIGHT);
```

Which of the replacements will produce the desired behavior?

(A) I only

(B) II only

(C) I and II only

(D) I and III only

(E) I, II, and III

23. Consider the following declarations.

```
Actor a = new Actor();
Bug b = new Bug();
Rock r = new Rock();
Critter c = new Critter();
```

Consider the following lines of code.

```
Line 1:    int dir1 = c.getDirection();
Line 2:    int dir2 = a.getDirection();
Line 3:    int dir3 = b.getDirection();
Line 4:    ArrayList<Location> rLoc = r.getMoveLocations();
Line 5:    ArrayList<Location> cLoc = c.getMoveLocations();
```

Which of the lines of code above will cause a compile time error?

(A) Line 1 only

(B) Lines 2 and 3 only

(C) Line 4 only

(D) Line 5 only

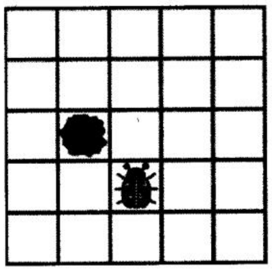
(E) Lines 4 and 5 only

24. Consider the following `TestBug` class declaration.

```
public class TestBug extends Bug
{
  public void act()
  {
    if (canMove())
    {
      move();
      if (canMove())
        move();
    }
    else
    {
      setDirection(getDirection() + Location.HALF_CIRCLE);
    }
  }
}
```

The following code segment will produce a grid that has a `Rock` object and a `TestBug` object placed as shown.

```
Grid<Actor> g = new BoundedGrid<Actor>(5, 5);
Rock r = new Rock();
r.putSelfInGrid(g, new Location(2, 1));
Bug t = new TestBug();
t.putSelfInGrid(g, new Location(3, 2));
```



Which of the following best describes what the `TestBug` object `t` does as a result of calling `t.act()` ?

(A) Moves forward two locations and remains facing current direction

(B) Moves forward two locations and turns 180 degrees

(C) Moves forward one location and remains facing current direction

(D) Moves forward one location and turns 180 degrees

(E) Stays in the same location and turns 180 degrees

25. A `DancingCritter` is a `Critter` that moves in the following manner. The `DancingCritter` makes a left turn if at least one of its neighbors is another `DancingCritter`. It then moves like a `Critter`. If none of its neighbors are `DancingCritter` objects, it moves like a `Critter` without making a left turn. In all other respects, a `DancingCritter` acts like a `Critter` by eating neighbors that are not rocks or critters. Consider the following implementations.

I.
```
public class DancingCritter extends Critter
{
  public ArrayList<Actor> getActors()
  {
    ArrayList<Actor> actors = new ArrayList<Actor>();
    for (Actor a : getGrid().getNeighbors(getLocation()))
    {
      if (a instanceof DancingCritter)
        actors.add(a);
    }
    return actors;
  }

  public void processActors(ArrayList<Actor> actors)
  {
    if (actors.size() > 0)
    {
      setDirection(getDirection() + Location.LEFT);
    }
    super.processActors(actors);
  }
}
```

II.
```
public class DancingCritter extends Critter
{
  public void processActors(ArrayList<Actor> actors)
  {
    boolean turning = false;
    for (Actor a : actors)
    {
      if (a instanceof DancingCritter)
        turning = true;
    }
    if (turning)
    {
      setDirection(getDirection() + Location.LEFT);
    }
  }
}
```

III.
```
public class DancingCritter extends Critter
{
  public void makeMove(Location loc)
  {
    boolean turning = false;
    for (Actor a : getGrid().getNeighbors(getLocation()))
    {
      if (a instanceof DancingCritter)
        turning = true;
    }
    if (turning)
    {
      setDirection(getDirection() + Location.LEFT);
    }
    super.makeMove(loc);
  }
}
```

Which of the proposed implementations will correctly implement the `DancingCritter` class?

(A) I only

(B) II only

(C) III only

(D) I and II only

(E) I, II, and III

26. Consider the following code segment.

```
int k = 0;
while (k < 10)
{
  System.out.print((k % 3) + "  ");
  if ((k % 3) == 0)
    k = k + 2;
  else
    k++;
}
```

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

(A) 0 2 1 0 2

(B) 0 2 0 2 0 2

(C) 0 2 1 0 2 1 0

(D) 0 2 0 2 0 2 0

(E) 0 1 2 1 2 1 2

27. Consider the following method. Method `allEven` is intended to return `true` if all elements in array `arr` are even numbers; otherwise, it should return `false`.

```
public boolean allEven(int[] arr)
{
  boolean isEven = /* expression */ ;

  for (int k = 0; k < arr.length; k++)
  {
    /* loop body */
  }

  return isEven;
}
```

Which of the following replacements for `/* expression */` and `/* loop body */` should be used so that method `allEven` will work as intended?

	`/* expression */`	`/* loop body */`
(A)	`false`	`if ((arr[k] % 2) == 0)` `isEven = true;`
(B)	`false`	`if ((arr[k] % 2) != 0)` `isEven = false;` `else` `isEven = true;`
(C)	`true`	`if ((arr[k] % 2) != 0)` `isEven = false;`
(D)	`true`	`if ((arr[k] % 2) != 0)` `isEven = false;` `else` `isEven = true;`
(E)	`true`	`if ((arr[k] % 2) == 0)` `isEven = false;` `else` `isEven = true;`

28. Consider the following code segment.

```
int x = /* some integer value */ ;
int y = /* some integer value */ ;

boolean result = (x < y);

result = ( (x >= y) && !result );
```

Which of the following best describes the conditions under which the value of `result` will be `true` after the code segment is executed?

(A) Only when `x < y`

(B) Only when `x >= y`

(C) Only when `x` and `y` are equal

(D) The value will always be `true`.

(E) The value will never be `true`.

---

29. Consider the following code segment.

```
for (int outer = 0; outer < n; outer++)
{
  for (int inner = 0; inner <= outer; inner++)
  {
    System.out.print(outer + " ");
  }
}
```

If `n` has been declared as an integer with the value 4, what is printed as a result of executing the code segment?

(A) `0 1 2 3`

(B) `0 0 1 0 1 2`

(C) `0 1 2 2 3 3 3`

(D) `0 1 1 2 2 2 3 3 3 3`

(E) `0 0 1 0 1 2 0 1 2 3`

30. Consider the following class declarations.

```
public class Base
{
  private int myVal;

  public Base()
  {  myVal = 0;   }

  public Base(int x)
  {  myVal = x;   }
}


public class Sub extends Base
{
  public Sub()
  {  super(0);   }
}
```

Which of the following statements will NOT compile?

(A) `Base b1 = new Base();`

(B) `Base b2 = new Base(5);`

(C) `Base s1 = new Sub();`

(D) `Sub s2 = new Sub();`

(E) `Sub s3 = new Sub(5);`

---

31. Assume that `a` and `b` are variables of type `int`. The expression

```
!(a < b) && !(a > b)
```

is equivalent to which of the following?

(A) `true`

(B) `false`

(C) `a == b`

(D) `a != b`

(E) `!(a < b) && (a > b)`

32. Consider the following code segment.

```
int a = 24;
int b = 30;
while (b != 0)
{
   int r = a % b;
   a = b;
   b = r;
}

System.out.println(a);
```

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

(A) 0

(B) 6

(C) 12

(D) 24

(E) 30

33. Consider the following method.

```
public int sol(int lim)
{
  int s = 0;

  for (int outer = 1; outer <= lim; outer++)
  {
    for (int inner = outer; inner <= lim; inner++)
    {
      s++;
    }
  }

  return s;
}
```

What value is returned as a result of the call `sol(10)` ?

(A) 20

(B) 45

(C) 55

(D) 100

(E) 385

34. Consider the following incomplete method. Method `findNext` is intended to return the index of the first occurrence of the value `val` beyond the position `start` in array `arr`.

```
// returns index of first occurrence of val in arr
// after position start;
// returns arr.length if val is not found
public int findNext(int[] arr, int val, int start)
{
  int pos = start + 1;

  while ( /* condition */ )
    pos++;

  return pos;
}
```

For example, consider the following code segment.

```
int[] arr = {11, 22, 100, 33, 100, 11, 44, 100};

System.out.println(findNext(arr, 100, 2));
```

The execution of the code segment should result in the value 4 being printed.

Which of the following expressions could be used to replace `/* condition */` so that `findNext` will work as intended?

(A) `(pos < arr.length) && (arr[pos] != val)`

(B) `(arr[pos] != val) && (pos < arr.length)`

(C) `(pos < arr.length) || (arr[pos] != val)`

(D) `(arr[pos] == val) && (pos < arr.length)`

(E) `(pos < arr.length) || (arr[pos] == val)`

35. Consider the following code segments.

I.
```
int k = 1;
while (k < 20)
{
  if (k % 3 == 1)
    System.out.print( k + "  ");

  k = k + 3;
}
```

II.
```
for (int k = 1; k < 20; k++)
{
  if (k % 3 == 1)
    System.out.print( k + "  ");
}
```

III.
```
for (int k = 1; k < 20; k = k + 3)
{
  System.out.print( k + "  ");
}
```

Which of the code segments above will produce the following output?

```
1  4  7  10  13  16  19
```

(A) I only

(B) II only

(C) I and II only

(D) II and III only

(E) I, II, and III

36. Consider the following two methods that appear within a single class.

```
public void changeIt(int[] list, int num)
{
  list = new int[5];
  num = 0;

  for (int x = 0; x < list.length; x++)
    list[x] = 0;
}


public void start()
{
  int[] nums = {1, 2, 3, 4, 5};
  int value = 6;

  changeIt(nums, value);

  for (int k = 0; k < nums.length; k++)
    System.out.print(nums[k] + " ");

  System.out.print(value);
}
```

What is printed as a result of the call `start()` ?

(A) `0 0 0 0 0 0`

(B) `0 0 0 0 0 6`

(C) `1 2 3 4 5 6`

(D) `1 2 3 4 5 0`

(E) `changeIt` will throw an exception.

37. Consider the following declaration of the class `NumSequence`, which has a constructor that is intended to initialize the instance variable `seq` to an `ArrayList` of `numberOfValues` random floating-point values in the range [0.0, 1.0).

```
public class NumSequence
{
  private ArrayList<Double> seq;

  // precondition:   numberOfValues > 0
  // postcondition:  seq has been initialized to an ArrayList of
  //                 length numberOfValues; each element of seq
  //                 contains a random Double in the range [0.0, 1.0)
  public NumSequence(int numberOfValues)
  {
    /* missing code */
  }
}
```

Which of the following code segments could be used to replace `/* missing code */` so that the constructor will work as intended?

I.
```
ArrayList<Double> seq = new ArrayList<Double>();
for (int k = 0; k < numberOfValues; k++)
  seq.add(new Double(Math.random()));
```

II.
```
seq = new ArrayList<Double>();
for (int k = 0; k < numberOfValues; k++)
  seq.add(new Double(Math.random()));
```

III.
```
ArrayList<Double> temp = new ArrayList<Double>();
for (int k = 0; k < numberOfValues; k++)
  temp.add(new Double(Math.random()));

seq = temp;
```

(A) II only

(B) III only

(C) I and II

(D) I and III

(E) II and III

38. Consider the following code segment.

```
double a = 1.1;
double b = 1.2;

if ((a + b) * (a - b) != (a * a) - (b * b))
{
  System.out.println("Mathematical error!");
}
```

Which of the following best describes why the phrase `"Mathematical error!"` would be printed? (Remember that mathematically $(a + b) * (a - b) = a^2 - b^2$.)

(A) Precedence rules make the `if` condition true.

(B) Associativity rules make the `if` condition true.

(C) Roundoff error makes the `if` condition true.

(D) Overflow makes the `if` condition true.

(E) A compiler bug or hardware error has occurred.

---

39. Consider the following recursive method.

```
public static String recur(int val)
{
  String dig = "" + (val % 3);

  if (val / 3 > 0)
    return dig + recur(val / 3);

  return dig;
}
```

What is printed as a result of executing the following statement?

```
System.out.println(recur(32));
```

(A) `20`

(B) `102`

(C) `210`

(D) `1020`

(E) `2101`

40. Consider the following method.

```
public String goAgain(String str, int index)
{
  if (index >= str.length())
    return str;

  return str + goAgain(str.substring(index), index + 1);
}
```

What is printed as a result of executing the following statement?

```
System.out.println(goAgain("today", 1));
```

(A) `today`

(B) `todayto`

(C) `todayoday`

(D) `todayodayay`

(E) `todayodaydayayy`