

1. Explain the difference between a CLASS and an OBJECT.
2. Define what the COMPILER does.
3. What language is a Web page written in? What Java code runs in a Web page?
4. What are the two things you must include in the variable declaration, and why do you need them?
5. Explain the difference between SYNTAX and SEMANTICS. Which one will you most likely find errors in at compile time? Which one will you find at run time?
6. Define a METHOD for an object. How do you invoke an object's method (e. g., given the String str, how would you use Java to get the length of str)? Define an INSTANCE VARIABLE for an object.
7. Fill in the right PARAMETERS for the page.drawLine() method to get a line from (0, 0) to (200, 100) in Java coordinates.
8. Give three examples of a Java type. How do you declare an array of each type?
9. How do you express the Boolean condition “j is less than 200 or j is more than 400” in a Java **if** statement? How do you express the Boolean condition “j is between 200 and 400” in a Java **if** statement?
10.

```
int [] a = {-1, 1, 9, 3};
int [] b = {0, 3, 4, 2};
float [] c = {3.1, 4.3, 5.9, 2.1, 0.9, -2.9};
```

What's c[b[a[3]]] + c[b[a[1]]]?
What's c[b[a[2]]] + c[b[a[1]]]?
11. How do you use a **while** loop to print a count from 0 to 100 by 5? How would you use a **for** loop to do this?
12.

```
String [] states = {"New York", "Kentucky", "Delaware"};
int j, k;

for (k = 0; k < states.length(); k = k + 1)
{
    state = states[k];
    // add code here to convert each state name to uppercase
}
```
13. What likely error is in this code? It will print “Red” to the screen.

```

boolean prime = false;
if ((prime=true) && (3 < 9))
    System.out.println("Red");
else
    System.out.println("Blue");

```

14. How do you ask the user for an integer and then read it in, as you did in your first program?

15. What's the filename extension for Java source code? What is the filename extension for a Java application?

16. Define a Java Boolean RELATIONAL OPERATOR, and give 4 examples.

17. What is the order in which to evaluate $3*1+4*(3+4)+5\%2$?

18. A breakpoint pauses the program at runtime. How do you pause the program until the user hits a key, without using a breakpoint?

19. What is the output for this code?

```

int i = 3;
if (i < 3)
    System.out.println(i);
else
    System.out.println(i+4);
System.out.println(i*2);

```

20. What does the Java compiler do with lines that start with `/**`?

21. What does the Java compiler do with WHITESPACE? Give 3 examples of whitespace.

22. What is the output for this code?

```

int i = 2;
String color = "Green";
if (i < 1) color = "Red";
else {
    if (i < 3) color = "Black";
    else color = "Yellow";
}
color = "Orange";
System.out.println(color);

```

23. What's k at the end of this code?

```
int k = 0;
while (k < 15)
    k = k + 1;
    k = 2 * k;
```

24. Function overloading is making the same operation do different things for different types of inputs. Does the function + in Java do overloading? Give 3 examples.

25. Add the code where the comment line is.

```
for (int k = 0; k < 10; k++)
    // print out the message "k is:" and the value of k
```

26. What's k at the end of this fragment?

```
int k = 2;
while ( k < 9)
    k = 3*k+k;
```

27. What's this code do?

```
for (i = 0; i < 20; i = i - 1)
    System.out.println(i);
```

28. Give the output for this code.

```
int [] nums = { 0, 1, 2, 3, 4 };
nums[2] = 9;
System.out.println(nums[3]/nums[2]);
System.out.println(nums[3]%nums[2]);
```

29. What's the output of this program?

```
String str = "Queen Elizabeth";
System.out.println(str[6]);
System.out.println(str.substring(0, 8));
```

30. What's wrong with this code?

```
int [] nums = { 9, 5, 3, 10, 23 };
nums[9] = 23;
```

31. Fill in the Java code below:

```
String [] poem = {      "Granfa Grig had a pig,",
                        "in a field of clover,"
```

```

        "Piggy died, and Granfa cried,",
        "and all the fun was over."
    };
    // print the poem using a while loop.

```

32. Take the following code:

```

int [] nums = {3, 10, 9, 2};
// write code to square each number in nums; make sure your code works for any length
array

```

33. If I define f as a function

```

public void f(int x)
{
    return x+1;
}

```

What's wrong?

34. What is a recursive method, and how can you tell?

Example:

```

int factorial(int x)
{
    if (x==1) return 1;
    else return x * factorial(x-1);
}

```

35. Order these arrays by memory size.

- A) `int[] a = new int[20];`
- B) `char[] b = new char[20];`
- C) `boolean [] c = new boolean[20];`

36. What does the code here do (it's not the obvious thing), assuming int i and int j are both already declared and initialized to 0:

```

while (i < 2);
{
    j = 2*i;
}

```

37. What code would you need to write to swap the values of two predefined ints, a and b? Why is it longer than 2 lines?

38. What is special about the constructor method declaration? What does the constructor do? How does this relate to the relation between a class and an object?

39. What is wrong with this code?

```

int g(int x, int y)
{

```

```

    int y;
    y = x*x-x;
    return y;
}

```

40. What is CONTROL FLOW in a program? Can an **if** statement alter control flow? How about a **while** statement? How about a call to the method of an object?

41. What is wrong with this code?

```

void g(int x)
{
    int y;
    y = x*x-x;
    return y;
}

```

42. Is a class the same thing as an object? How about a method?

43. Can you return an int and a boolean from the same method?

44. When you click on Debug->Start and the program you wrote begins running, where does it begin?

45. What is wrong with this code?

```

void g()
{
    int x, y, z;
    x = 3;
    z = x;
    while (x == z)
    {
        y = z*2;
        x = y/2;
    }
}

```

46. Can methods be called by other methods, or only from main?

47. What's wrong with this code?

```

int [] nums = new nums[7];
int i;
for (i = 0; i <= 7; i++)
    nums[i] = 2*i*i-3*i;

```

48. When you call Math.sqrt(x) in java, why is this a static call?

49. If int y is declared and set to 0 to start, what's this code set y to?

```
while (y < 5)
    while (y < 10)
        y = y + 1;
```

50. public class Rectangle

```
{
    public int topleft_x;
    public int topleft_y;
    public int height;
    public int width;
    public void Move(int dx, int dy)
    {
        // fill this code in
    }
    public void Rotate90()
    {
        // fill this code in
    }
}
```

51. double z = 2.0;
double [] stuff = new int[10];
int used = 4;
for (i = 0; i < used; i++)
{
 stuff[i] = 2.0 + z;
 z = z*z;
}

What's in stuff after this code executes?