

"Data Types and Variables"

1. How many copies of the value 42 are created by this code?

```
int myInt1 = 42;  
int myInt2 = myInt1;  
int myInt3 = myInt2;
```

A. 1

B. 2

C. 3

D. It is impossible to tell.

2. How would you print the following string to the console? "Nonsense", she said!

A. `System.out.println("Nonsense", she said!);`

B. `System.out.println("\"Nonsense\", she said!");`

C. `System.out.println("Nonsense", she said!");`

D. `System.out.println(\"Nonsense\", she said!);`

3. What is the best naming style to use for a variable that contains a count of the number of frogs in a pond?

A. `frog_count`

B. `frogCount`

C. `FrogCount`

D. All styles are equally valid; just be consistent

4. What governs a numeric data type's precision and range?

A. The number of bytes in memory the data occupies

B. The way the compiler interprets the data type at runtime

C. The general category of the numeric data type

D. The amount of CPU power applied to the program

5. What properties on the Java numeric wrapper classes hold the largest and smallest possible values for that data type?

- A. MAX_VALUE and MIN_VALUE
- B. BIGGEST_VALUE and SMALLEST_VALUE
- C. MAX_NUM and MIN_NUM
- D. BIG_NUM and SMALL_VALUE

6. After the following statement, what value is stored in the myInteger variable?
int myInteger;

- A. 0
- B. 1
- C. null
- D. impossible to tell; randomly assigned based on computer memory contents

7. Which assignment statement correctly assigns a decimal value to the variable "myFloat" that was already declared as a float data type?

- A. myFloat = 2.1;
- B. myFloat = 2.1D;
- C. myFloat = 2.1F;
- D. myFloat = 2.1(float);

8. Which data type would you use to hold a true or false value?

- A. short
- B. double
- C. int
- D. boolean

9. Which of the following variable names is invalid?

A. 1place

B. int

C. SHOO FLY

D. They are all invalid.

10. What's wrong with always using the largest possible data type to store your data?

A. Larger data types take more memory

B. It's harder to apply mathematical operators to larger data types

C. Larger data types are not available on smaller, older systems

D. Nothing; you should always use the largest possible data type

11. If you needed to hold the integer value 36,493, which numeric data type would you use?

A. int

B. double

C. short

D. byte

12. What are the two main categories of numeric data types as stored in computers?

A. integer and floating point

B. big and small

C. positive and negative

D. real and imaginary

13. Which data type can hold exactly two different values?

A. boolean

B. char

C. byte

D. binary

14. What is the smallest data type that can hold the value 126?

A. byte

B. short

C. float

D. int

15. After the following code is run:

```
double num1 = 9.6;
```

```
int num2 = (int)num1;
```

What is the value in num2?

A. 9

B. 9.6

C. 6

D. 9.60

16. What keyword do you use to ensure a variable can never change values while your program is running?

A. final

B. const

C. static

D. Variables can always be changed with an assignment statement

17. Which statement correctly assigns the character value 'x' to the char variable myChar?

A. char myChar = 'x';

B. myChar as char = 'x';

C. character myChar = "x";

D. char myChar = "x";

18. Which object is used to write output to the console?

A. System.out

B. System.in

C. Console

D. OutputStream

19. What is the difference between the print() and println() functions?

A. println() will automatically wrap to the next line; print() will not

B. print() will automatically wrap to the next line; println() will not

C. println() will accept any string; print() will only take variables

D. println() is only for output; print() can also be used to gather user input

20. What text string is printed to the screen with this statement?

```
System.out.println("#\"##\");
```

A. ##\#

B. #\"##\#

C. ####

D. None; there is a syntax error

"Working With Strings"

Consider the following three string variables for the first five questions:

```
String myString1 = "not so loud!";
```

```
String myString2 = "NOT SO LOUD!";
```

```
String myString3 = "No thanks";
```

1. Which expression will return true if the contents of myString1 are equal to the contents of myString2?

A. myString2.equals(myString1)

B. myString1 == myString2

C. myString1 = myString2

D. They all return true

2. Which expression will return true?

A. myString1.equalsIgnoreCase(myString2)

B. myString2.equalsIgnoreCase(myString1)

C. myString3.equalsIgnoreCase("NO THANKS")

D. They all return true

3. What are the minimum and maximum valid character index values in myString3?

A. 1 and 9

B. 0 and 8

C. 0 and 9

D. 1 and 8

4. What is returned by the expression myString2.substring(1)

A. OT SO LOUD!

B. NOT SO LOUD!

C. !

D. That expression will produce a compiler error

5. What is returned by the expression `myString1.lastIndexOf("o")`

A. -1

B. 1

C. 5

D. 8

6. What does the `myString` variable contain after the following code sequence:

```
String myString = "hello number "; // note the space at the end of the string
```

```
myString = myString + myString.length();
```

A. "hello number "

B. "13"

C. null

D. "hello number 13"

7. What string is produced by this expression:

```
String.format("%1$s and %1$5s and %1$-5s",1,2,3))
```

A. "1 and 2 and 3 "

B. "1 and 25 and -35"

C. "1 and 1 and 1 "

D. "%11 and %115 and -%115"

8. What string is produced by this expression:

```
String.format("%4$s %3$s %2$s %1$s",4,3,2,1)
```

A. "%1\$s %2\$s %3\$s %4\$s"

B. "1 2 3 4"

C. "4 3 2 1"

D. "1.0 2.0 3.0 4.0"

9. Which line of code will result in `myInt = 42` ?

A. `int myInt = Integer.parseInt ("42");`

B. `int myInt = "42";`

C. `int myInt = Integer("42").toString();`

D. `int myInt = Integer.toString("42");`

10. Which line of code will result in `myString = "1.7320508"` ?

A. `String myString = Double.convert(1.7320508);`

B. `String myString = String.format(1.7320508);`

C. `String myString = Double.toString(1.7320508);`

D. `String myString = Double("1.7320508");`

11. What is the default value of a reference variable after it is declared?

A. `null`

B. `0`

C. `false`

D. Random junk until you initialize it

12. How would you declare and initialize a primitive wrapper class for the double data type that contains the value 1.0?

A. `Double myDouble = new Double(1.0);`

B. `double myDouble = 4.0`

C. `Double(4.0) = myDouble;`

D. `double myDouble = 4.0F;`

13. Given the following code, what is the result of calling `myString1.equals(myString2)`?

```
String myString1 = "abc";
```

```
String myString2 = "ABC";
```

A. true

B. false

14. Given the code below, is it true that `myString1.equals(myString2)` and `myString2.equals(myString1)` will produce the same result?

```
String myString1 = "abc";
```

```
String myString2 = "ABC";
```

A. true

B. false

15. Given the code below, what is the value stored in result?

```
String myString = "quiz";
```

```
int result = myString.length();
```

A. 4

B. 3

C. 5

D. An exception will be thrown.

16. Given the code below, what is the value stored in result?

```
String myString = "quiz";
```

```
boolean result = myString.contains("Z");
```

A. true

B. false

17. What is stored in the result variable by the following code?

```
String result = String.format("I'll take %5s please", "2");
```

A. I'll take 2 please

B. I'll take 2 please

C. I'll take 5 please

D. I'll take 5 please

18. What is stored in the result variable by the following code?

```
String result = "Captain," + "incoming" + "message";
```

A. Captain,incomingmessage

B. Captain, incoming message

C. Captain,

D. incoming message

19. What is stored in the result variable by the following code?

```
boolean myBool = true;
```

```
String result = Boolean.toString(myBool);
```

A. true

B. false

C. 1

D. 0

20. What is stored in the result variable by the following code?

```
int result = Integer.parseInt("forty-two");
```

A. A run-time exception will be shown

B. 42

C. forty-two

D. 42.0

"User Input"

For all questions assume the following declaration has been made for your main() function:

public static void main(String[] args)

1. If a program "Tester" is run from the command line as shown below, what is the value of args[0]?

```
java Tester sing a song
```

A. "sing a song"

B. "song"

C. "a "

D. "sing"

2. How to you create a new Scanner object to get user input from the console?

A. Scanner input = new Scanner();

B. Scanner input = Scanner.System.in;

C. Scanner input = new Scanner(System.in);

D. Scanner input = new Scanner(console);

3. If you use one of the next() methods to retrieve a numeric data type, what can you do to clear any newline (\n) the user may have entered from the input stream?

A. Call nextLine()

B. Call the same next() method again

C. Call System.out.println("\n")

D. The next() methods will clear all newlines, so nothing else needs to be done

4. What happens if you call Scanner.nextInt() and the user has entered "abc"?

A. You will receive the default value (0) for the data type

B. The Scanner will automatically wait until the user enters a valid number

C. The system will automatically prompt the user for a valid number

D. Your program will throw an exception

5. What is the result of calling `hasNextByte()` on your `Scanner` object if the user has entered "abc" on the console?

A. true

B. false

C. "abc"

D. "a"

6. What might you want to do before calling one of the `Scanner` input methods?

A. Print a message to the console so the user knows what to do

B. Recreate your `Scanner` object

C. Clear the screen

D. Print out a newline character (`\n`) so the user doesn't have to press Enter

7. What `Scanner` function would you call to get a double (floating point) value from the user input?

A. `getDouble()`

B. `nextDouble()`

C. `double()`

D. `readDouble()`

8. What `Scanner` function would you call to get a full line of user input?

A. `next()`

B. `nextString()`

C. `nextLine()`

D. `readLine()`

9. Which if() statement will ensure you have 3 or more command-line parameters?

A. `if (args.length() > 1)`

B. `if (args.length() > 2)`

C. `if (args.length() > 3)`

D. `if ((length(args) > 3)`

10. Why is it important to validate any expected parameters from the command-line?

A. Your program may encounter an exception if you try to use a parameter that does not exist in the args array

B. The JVM will add empty strings if there are not enough parameters

C. Your program may crash if there are too many parameters

D. Because the "args" variable could be null

11. Which of the following expressions will give you the number of parameters passed into the `main(String[] args)` function?

A. `args.length`

B. `length(args)`

C. `args.size`

D. `main.length`

12. If you type the command below on the command line, how many parameters will be passed to the Mystery program?

```
java Mystery data
```

A. 1

B. 0

C. 2

D. 3

13. Which of the following keywords can be used to test a condition and make decisions in your program?

A. if

B. compare

C. check

D. assert

14. What package contains the Scanner class?

A. java.util

B. java.lang

C. java.system

D. system.util

15. If the user enters data "awesome" when you prompt for a number, what will happen when you call nextInt() to read the data?

A. Your program will get an InputMismatchException

B. Your program will get a NullPointerException

C. You will get a default 0 value if the data can't be parsed

D. You will get some numeric value that represents the character 'a'

16. What Scanner function can you call to see if a "short" data value is currently waiting on the input stream?

A. hasNextShort()

B. isShort()

C. nextShort()

D. parseShort()

17. What keyword can be used to execute a block of logic when the tested "if" expression returns false?

A. else

B. then

C. break

D. while

18. What should you remember to do after using any combination of the hasNext() and next() functions?

A. Call nextLine() to clear the newline from the input stream

B. Discard the Scanner object

C. Close the input stream

D. Nothing special needs to be done

19. What do you need to do after a hasNextDouble() function returns false, meaning the user has entered something other than a double value?

A. Call next() to read the unexpected data from the stream as a String

B. Exit the program immediately

C. Close the Scanner immediately

D. Keep calling hasNextDouble() until the user enters correct data

20. You cannot be certain ahead of time how many command-line parameters a Console program will receive.

A. True

B. False

"Basic Flow Control"

1. Given the following while() loop, which statement is true assuming A,B,C,D are int variables and $A > B$?

```
while ( ( A >= B ) || ( ( C - D ) > 10 ) )  
{  
System.out.println(A + B + C + D);  
}
```

- A. The program will never enter the loop body
- B. The program will never leave the loop body
- C. The System.out.println() statement cannot convert the integers to strings
- D. The logical expression is not valid

2. If "a = 3" and "b = 5", what is the result of the following logical expression?

$(a > b) \parallel (b == 5)$

- A. Compiler error
- B. True
- C. False
- D. An exception will be thrown

3. What is the result of the following mathematical expression? $2 * ((6 + 4) / 2)$

- A. 10
- B. 8
- C. 14
- D. 16

4. What is the result of the following mathematical expression? $2 * 6 + 4 / 2$

- A. 10
- B. 8
- C. 14
- D. 16

5. What is wrong with this if() statement if "a" and "b" are both ints?

```
if (a = b)
```

- A. You cannot use an assignment statement as a logical expression
- B. This will result in true no matter what the values of "a" and "b" are
- C. This will result in false no matter what the values of "a" and "b" are
- D. This will throw an exception at runtime

6. What will be the output of the following for() loop:

```
for (int i=0; i<10; i+=3)
```

```
{  
System.out.print(i * 3 + " ");  
}
```

- A. 1 3 6 9 12 15 18 21 24 27 30
- B. 0 3 6 9 12 15 18 21 24 27
- C. 0 9 18 27
- D. 0 3 6 9

7. What will be the output of the following for() loop:

```
String target = "millisecond";
```

```
for (int i=0; i<target.length(); i++)
```

```
{  
if (target.charAt(i) == 'l')  
break;  
else  
System.out.print(target.charAt(i));  
}
```

- A. m
- B. mi
- C. millisecond
- D. miisecond

8. When might you want to use a do-while() loop instead of a while() loop?

- A. If you are sure the loop body should execute at least once
- B. When you don't know if the loop body should execute at all
- C. When you want to more accurately control the number of loop iterations
- D. When you don't have a valid logical expression to use

9. When will the following code print "you can drive" ?

```
if (age >= 16)
{
System.out.println("you need a learner's permit");
}
else if (age >= 18)
{
System.out.println("you can drive");
}
```

- A. Always
- B. When age is greater than or equal to 16
- C. When age is greater than or equal to 18
- D. Never

10. Which of the following is a valid logical expression (assuming "a" and "b" are ints)?

- A. $(a > (1 + b))$
- B. $(a == 3)$
- C. $((a + 3) > (b + 2))$
- D. All are valid logical expressions

11. The following logical expression illustrates what concept?

$!(A \parallel B) = !A \ \&\& \ !B$

- A. DeMorgan's Theorem
- B. Short-circuiting
- C. Mathematical expression
- D. flow control

12. What is the difference between the "==" and "=" operators?
- A. "==" tests for equality, "=" is an assignment
 - B. "=" tests for equality, "==" is an assignment
 - C. "==" is used on strings, while "=" is used on numbers
13. When using an if() statement, what must go within the parentheses?
- A. A logical expression
 - B. A mathematical expression
 - C. A string
 - D. An else clause
14. How many "else if ()" clauses can you have after an if() expression?
- A. 0, 1, or more
 - B. 1 only
 - C. 0
 - D. Up to 3
15. In Java 7, what values are valid as a case statement selector?
- A. numbers, letters, or strings
 - B. numbers only
 - C. letters only
 - D. strings only
16. What happens if you leave out the "break" keyword within a case statement?
- A. Program flow will continue through to the next case
 - B. Program flow will skip down to the default case
 - C. Program flow will skip down to after the end of the switch statement
 - D. An exception will be thrown

17. Which of the following for() loops will execute 10 times?

- A. All of these will execute 10 times
- B. for (int index = 0; index < 10; index++)
- C. for (int index = 1; index <= 10; index++)
- D. for (int index = 10; index < 20; index++)

18. Which of the following update expressions is valid to replace the ??? phrase within the for() loop below?

```
for (int i=0; i<10; ???)
```

- A. All of these are valid
- B. i++
- C. i = i - 5
- D. i = i * 2

19. How many times will the following do-while() loop execute?

```
boolean done = true;  
do  
{  
done = false;  
} while (!done);
```

- A. Infinite number of times
- B. 0
- C. 1
- D. 2

20. Which loop is always the best choice: for(), while(), or do-while()?

- A. It depends on the needs of your program
- B. for()
- C. while()
- D. do-while()

"Writing Methods"

1. Assuming myMethod() returns a string, which of the following statements is valid?

- A. myMethod();
- B. System.out.println(myMethod());
- C. String result = "Return value is " + myMethod();
- D. All of these are valid

2. Given the following function declaration:

```
private static double mystery(double a, int b)
{
return a * b;
}
```

What is the result of executing the following code?

```
int a = 3;
double b = 2.0;
System.out.println( mystery( a, b ));
```

- A. "6.0" will be printed to the console
- B. "6" will be printed to the console
- C. Nothing, there is a compile-time error
- D. Nothing, a run-time exception will be thrown

3. Given the following method definitions:

```
private static void mystery(double a)
{
System.out.print("double! ");
}
private static void mystery(int a)
{
System.out.print("int! ");
}
```

What will be the output of the following code?

```
mystery(1);
mystery(1.0);
```

- A. int! double!
- B. double! int!
- C. Duplicate function names results in a compiler error
- D. It is impossible to predict

4. Given the following method:

```
private static void mystery(int a)
{
    a = 3;
    System.out.print(a + " ");
}
```

What is the result printed to the console when the following code is executed?

```
int a = 4;
mystery(a);
System.out.print(a + " ");
```

A. 4 3

B. 3 4

C. 4 4

D. 3 3

5. What does the following method return if $a = -8.0$ and $b = 2.0$?

```
private static double mystery(double a, double b)
{
    if (a > 0)
        return a * b;
    else if (a < 0)
        return a / b;
    return 0;
}
```

A. $a * b$

B. a / b

C. 0

D. An exception will be thrown

6. What is wrong with the following declaration for the `empty()` method?

```
public class Tester
{
}
public static void empty()
{
}
```

- A. It is not enclosed within the curly braces of the Tester class
- B. All methods other than main() must be declared as private
- C. All methods must return some value
- D. The method does not receive any input parameters

7. What is wrong with the following function declaration?

```
static void errorProne(int a, double a)  
return a + a;
```

- A. It is declared as a void but returns some data
- B. It has duplicate parameter names
- C. It is missing curly braces
- D. All of these things are wrong

8. What keyword must be used on any method (function) on your class that is called from your main() method?

- A. static
- B. public
- C. private
- D. void

9. Which of the following method names are invalid?

- A. _a1()
- B. _1a()
- C. 1_a()
- D. a_1()

10. Which of the following statements best reflects "functional decomposition"?
- A. Get rid of old methods you haven't used in a while
 - B. Keep your method bodies as long as possible
 - C. Careful analysis of your code to ensure it is error-free
 - D. Break a large task into a series of smaller, simpler methods
11. What three words are often used interchangeably to represent a function?
- A. function, method, subroutine
 - B. function, loop, flow control
 - C. function, purpose, task
 - D. function, main, declaration
12. What two symbols define the beginning and ending of the function body?
- A. { and }
 - B. (and)
 - C. [and]
 - D. /* and */
13. Which of the following locations are valid places to add a function definition?
- A. Inside a class body, but outside other function bodies
 - B. Inside other function bodies
 - C. Outside a class body
 - D. These are all valid locations
14. Which of the following functions correctly declares a double and a string parameter?
- A. `static void myFunction(double p1, string p2)`
 - B. `static void myFunction(double, string)`
 - C. `static void myFunction(p1, p2)`
 - D. `static void myFunction(int myDouble, int myString)`

15. What can you do with function parameters within a function body?

- A. The same things you can do with any other locally declared variable
- B. You can read the parameters but not change their local value
- C. You can write the parameters but not read their value
- D. You can change their data type

16. How is it possible to declare more than one function with the same name?

- A. By using different combinations of parameter data types to uniquely identify the function
- B. It is not possible to have duplicate function names
- C. By declaring one version as public and one version as private
- D. By ensuring that each version returns a different data type

17. What is the return data type of the following function?

```
public static double mystery(int myInt, float myFloat, String myString)
```

- A. double
- B. int
- C. float
- D. String

18. Given the code below, what is true about the mystery() function?

```
static void mystery(Object myObj)
```

- A. The mystery() function will receive a copy of the object reference, which it can use to access the original object
- B. The mystery() function will receive a copy of the original Object
- C. The mystery() function will be able to modify the original myObj reference to point to a different Object
- D. None of these are true

19. Which of the following statements correctly calls the mystery() function which was declared with a void return type?

A. mystery()

B. int result = mystery();

C. if (mystery() == 3)

D. All of these are correct

20 . When passing variables into functions as parameters, which of the following statements is true?

A. Only the order and data types of the variable parameters are important

B. The variable names must match the parameter names

C. The compiler will automatically assign the correct variable value to a parameter of matching data type regardless of order

D. You will get a run-time error if your data types don't match

"Debugging and Exceptions"

1. After a Java statement throws an exception, what happens to the remaining code statements after the one that threw the exception?

- A. They will execute normally, ignoring the previous exception result
- B. They will execute normally after you acknowledge the exception dialog
- C. They will execute only if the exception did not corrupt any program data
- D. Remaining statements are ignored because program flow has been transferred out of that function or your program entirely.

2. If you are sitting in break state in the debugger and the next line of code is a method call, which of the following debugger commands would you use if you wanted to see what happens inside the method body?

- A. Run
- B. Step Over
- C. Step Into
- D. Step Out

3. What are the primary advantages of a debugger?

- A. Allows you to step line-by-line through your code at run-time
- B. Let you examine the contents of variables at run-time
- C. Both of these are useful debugger features
- D. Neither of these things are possible with a debugger

4. What is a good reason to catch exceptions in your code?

- A. All of these are good reasons
- B. To keep your program from exiting
- C. To provide a friendly and useful error message to the user
- D. To run a particular block of code in response to the error condition

5. What kind of run-time exception will be thrown by the following code?

```
double top = 543;  
double bottom = top * 0;  
double result = top / bottom;
```

- A. NullPointerException
- B. ArrayIndexOutOfBoundsException
- C. ArithmeticException
- D. IllegalArgumentException

6. What kind of run-time exception will be thrown by the following code?

```
String danger;  
int len = danger.length();
```

- A. NullPointerException
- B. ArrayIndexOutOfBoundsException
- C. ArithmeticException
- D. IllegalArgumentException

7. When in break state, how do you view the values of your program's variables?

- A. You can hover your mouse cursor over the variable name
- B. You can look in the "Variables" pane
- C. Both of these are correct
- D. Neither of these are correct

8. When sitting in break state in the debugger and a line of code is highlighted, which line of code has just been executed?

- A. The line of code just before the highlighted one
- B. The highlighted line of code
- C. The line of code just after the highlighted one
- D. The first statement in the parent function

9. When trying to resolve errors, in what situation might code review work the best?

A. Small programs

B. Larger programs where you have narrowed down the problem to a smaller area

C. Both of these are good candidates

D. Neither of these are good candidates

10 . Why would you set a breakpoint in your code before running the program in the debugger?

A. Because you believe that line of code is causing the error

B. Because you want to skip through a bunch of lead-up code to get to the interesting area

C. Because you want to examine the program state before that line of code is executed.

D. All of these are valid reasons to set a breakpoint.

11. You have attempted to identify the area throwing an exception by adding some program tracing as follows:

```
System.out.println("Here 1");
```

```
// suspicious logic area 1
```

```
System.out.println("Here 2");
```

```
// suspicious logic area 2
```

```
System.out.println("Here 3");
```

```
// suspicious logic area 3
```

```
System.out.println("Here 4");
```

If your resulting console output when the program is run contains the following lines, where was the exception thrown?

```
Here 1
```

```
Here 2
```

A. Suspicious logic area 1

B. Suspicious logic area 2

C. Suspicious logic area 3

D. It's impossible to tell with program tracing alone

12. When an exception is thrown from within a try block, what happens to the remaining statements below the exception point in the try block?

A. They are skipped

B. They are executed normally

C. They are executed once the exception-handling code in the catch block is completed

D. None of these are true

13. What object can you receive as a parameter to the catch block?

A. `java.lang.Exception`

B. `java.lang.Error`

C. `java.lang.ErrorMessage`

D. `java.util.Ex`

14. Which of the following kinds of code are good candidates for try/catch protection?

A. All of these are true

B. Risky code

C. Complicated code

D. Code that receives user input

15. What function call on the Exception object within the catch block will produce a text description of the error?

A. `getMessage()`

B. `toString()`

C. `getDetails()`

D. `errorMsg()`

16. Which of the following debugging techniques involves adding output statements to track your progress through the code?

A. Program tracing

B. Code review

C. Using a debugger

D. None of these is correct

17. What is the best conceptual description of where a debugger runs?

A. Between your program and the JVM or OS

B. On top of your program

C. Underneath the JVM or OS

D. The debugger is embedded into your program

18. Which program state is the most useful for inspecting your program variables?

A. In break state

B. In running state

C. You can inspect your program variables in both states

D. None of these is true

19. Which debugging command will let you execute all of the remaining statements in a function and return to the calling code, remaining in break state, in one step?

A. Step Out

B. Step Into

C. Run

D. Stop

20. What can you set to cause a program to drop out of running and into break state?

A. Breakpoint

B. Stop sign

C. Halt signal

D. Trap door

"Introduction to OOP"

1. Which of the following is a Java object?

A. All of these are objects

B. Object

C. Integer

D. String

2. What is one advantage of writing objects?

A. Other programmers can re-use your work

B. The code is always shorter

C. You will always spend less time writing objects

D. Your code is guaranteed to have fewer bugs

3. The objects Bicycle, Wheel, Chain, Pedal, Seat, Frame, and HandleBar are examples of what OOP feature?

A. Modeling complex systems

B. Inheritance

C. Data Encapsulation

D. Black Box

4. Which of the following two objects are most likely in an inheritance relationship?

A. Flower, Rose

B. LawnMower, Grass

C. Tea, Coffee

D. Dog, Cat

5. What OOP principle does the following code violate?

```
class Mystery
{
public int myData;
}
```

A.Data Encapsulation

B.Inheritance

C.Modeling Complex Systems

D.Functional Decomposition

Consider the following class definition for the next four questions. Assume the Vault, ATM, SafetyDepositBox, and Customer objects have been correctly defined somewhere else.

```
public class Bank
{ private Vault myVault;
public ATM myAtmMachine;

public SafetyDepositBox accessBox(Customer c)
{ /* method implementation not shown */ }

public void depositMoney(int amount)
{ myVault.add(amount); }

private void callPolice()
{ /* method implementation not shown */ }
}
```

6. With which classes does the Bank class have a "has-a" relationship?

A. Vault, ATM

B. Customer, SafetyDepositBox

C. Vault, ATM, Customer, SafetyDepositBox

D. None of the above

7. With which classes does the Bank class have a "uses-a" relationship?

A. Vault, ATM

B. Customer, SafetyDepositBox

C. Vault, ATM, Customer, SafetyDepositBox

D. None of the above

8. Which object is best-protected by data encapsulation?

A. myVault

B. myAtmMachine

C. Customer c

D. None of the above

9. Which of the following code snippets will produce a compiler error, assuming this statement comes first:

Bank b = new Bank();

A. ATM a = b.myAtmMachine;

B. b.depositMoney(0);

C. SafetyDepositBox box = b.accessBox(new Customer());

D. b.callPolice();

10. When modeling a complex system, how many individual objects should you define?

A. Enough that each object is reasonably small, well-understood, and representative of some real-world component

B. You should stop after three or four levels of hierarchy

C. Define as few objects as you can, packing as much functionality as possible into a single object

D. Stop when each object contains 10 or fewer code statements

11. Which of the following terms best describes a programming "black box"?

A. Data encapsulation

B. Recording object

C. Mysterious code

D. Inheritance

12. Which of the following is true, assuming careful data encapsulation procedures are defined?

A. All of these are true

B. You can change your internal data implementation, so long as your public function interfaces and behaviors do not change

C. Other objects have no direct access to your internal data

D. Other objects have no knowledge of how you actually implement internal behavior

13. What three things should usually be considered when defining an object?

A. Properties, methods, relationships

B. Size, scope, complexity

C. properties, composition, access

D. decomposition, composition, behavior

14. Where do you declare member variables for a class?

A. Inside the class curly braces but outside a function

B. Outside the class curly braces

C. Inside a function's curly braces

D. Below the ending class curly brace

15. Given the class definition below, which example shows how to correctly call the "mystery" method on the HauntedHouse object from some code outside the class?

```
class HauntedHouse  
{ public void mystery() { }  
}
```

A. `HauntedHouse spooky = new HauntedHouse();
spooky.mystery();`

B. `HauntedHouse.mystery();`

C. `HauntedHouse spooky; mystery();`

D. `HauntedHouse spooky = mystery();`

16. Which of the following answers defines a property with a private access level?

A. `private String mySecret;`

B. `String mySecret private;`

C. `private: String mySecret;`

D. `private(String mySecret);`

17. If the Mystery class contains a private function called `secret()`, which of the following lines of code will execute that function from some other class?

A. You cannot call private methods on other classes

B. `Mystery.secret();`

C. `Mystery m = new Mystery();
m.secret();`

D. `Mystery m;
m.secret();`

18. Which properties and methods can be accessed by any other object?

A. `protected`

B. `private`

C. `public`

19. Which properties and methods can only be accessed by the object that defines them?

A. protected

B. private

C. public

20 . Which properties and methods can only be accessed by the object that defines them, or by objects that inherit from or subclass from the first object?

A. protected

B. private

C. public

"Objects in Java"

1. Which of the following tasks do you usually complete within an object's constructor?

- A. Initialize the class member variables to default values
- B. Call each of the public class methods to make sure they work
- C. Make a backup copy of the object for safekeeping
- D. None of these things are commonly done inside a constructor

2. Which of the following functions declarations would define a valid constructor for the **CellPhone** class?

- A. `public CellPhone()`
- B. `public CellPhone(String myNumber)`
- C. `public CellPhone(int myNumber)`
- D. All of these are valid constructor function declarations

3. How many interfaces can a class implement at one time?

- A. 0
- B. 1
- C. any number (0, 1, or more)
- D. classes cannot implement interfaces

4. How many different classes can implement the same interface?

- A. 0
- B. 1
- C. any number (0, 1, or more)
- D. classes cannot implement interfaces

5. Why do we start all of our example interface names with "I" as in "ILogin"?

- A. This is a convention that tells you at a glance the name represents an interface
- B. The Java language requires this naming convention in order to compile correctly
- C. This tells you very specifically what kind of functions are inside the interface
- D. The "I" is required to safely put interfaces in their own package hierarchy

6. When considering an AutomaticTellerMachine object which allows people to get money from a bank using their personal debit card, which of the following interfaces might be useful for the AutomaticTellerMachine to implement?

- A. ILogin, which allows customers to validate their 4-digit PIN
- B. IWithdrawal, which allows customers to get money from their account
- C. IStatement, which allows customers to view the current account balance
- D. Implement all of them since an object can support more than one interface

7. If the ILogin interface is defined as follows:

```
public interface ILogin
{
    public boolean validatePIN(int pin);
}
```

Which of the following methods would satisfy the interface requirements for a class that implements the ILogin interface?

- A. `public void validatePIN(int pin) { return true; }`
- B. `public boolean validatePIN(int pin) { return true; }`
- C. `public boolean validatePIN(String pin) { return true; }`
- D. They would all satisfy the interface requirements

8. If you declare a class member variable as "static", how many copies of that variable will ever exist at one time?

- A. One
- B. One per class instance created with the new keyword
- C. One new copy is created each time the static variable's value is changed
- D. Variables cannot be declared as static; only methods can be static

9. Which of the following CellPhone class declarations correctly implements the IDialer interface?

- A. public class CellPhone implements IDialer
- B. public class CellPhone : IDialer
- C. public class IDialer implements CellPhone
- D. public interface IDialer implements CellPhone

10. What is wrong with the following code?

```
class HauntedHouse
{
    static String scare = "Boo";

    public void mystery()
    {
        System.out.println(scare);
    }
}
```

- A. You cannot use a static member variable from within a non-static function
- B. Nothing, this will print "Boo" when mystery() is called
- C. A run-time exception will be thrown
- D. The mystery() function will only work if there is exactly one copy of HauntedHouse object active at a time

11. When is a constructor function run?

- A. Automatically when an object is created with the new keyword.
- B. Automatically when an object is destroyed
- C. When you call the construct() method in your code
- D. When you call the method from your code using the name of the class.

12. What happens if you do not declare your own constructor?

- A. A default constructor will be created for you
- B. You will get a compile-time error
- C. You will get a run-time error when you create the object
- D. All of your member variables will be initialized to random data

13. How many different constructors can you define for a class?

- A. As many as you like, as long as they all have different combinations of parameters
- B. Just one to replace the default
- C. One plus the default
- D. As many as you like, so long as they all have different names

14. Where are interface definitions stored?

- A. In a *.java file named after the interface
- B. In a *.interface file named after the interface
- C. In the same *.java file as the class implementing the interface
- D. In a *.class file named after the interface

15. How would you implement a method body within an interface definition?

- A. You cannot; interfaces just have method declarations but no bodies
- B. Use normal function syntax, nothing special needs to be done
- C. Add the "interface" keyword in front of the method definition
- D. Add the "public" keyword in front of the method definition

16. Which of the following statements successfully declares the Mystery class as implementing the IHaunt interface?

- A. `public class Mystery implements IHaunt`
- B. `public class Mystery extends IHaunt`
- C. `public class Mystery uses IHaunt`
- D. `public class IHaunt implements Mystery`

17. If a class property is declared as static, and you create two instances of the class, how many copies of the property exist?

- A. 1
- B. 0
- C. 2
- D. 3

18. Which statement correctly reads the static String property Color from the class Water?

- A. `String c = Water.Color;`
- B. `String c = new Water().Color;`
- C. `String c = Color.Water;`
- D. `String c = Color;`

19. If you change the value of a static property within one instance of a class, what happens to that property when accessed by other instances of the class?

- A. The property immediately changes to the new value for all classes
- B. Each class maintains its own copy of the property
- C. The property change causes a deep copy to trigger in all other classes, resulting in new copies in each class
- D. An exception is thrown in the other classes

20. What is wrong with the following code?

```
class HauntedHouse
{
static public void main(String[] args)
{ mystery(); }

public void mystery() { }
}
```

- A. You cannot call a non-static function from within a static function
- B. Nothing, this will work fine
- C. A run-time exception will be thrown
- D. The mystery() function will be called on all copies of the HauntedHouse object

"Graphical Java Programs"

1. A pixel located at coordinates (0, 800) will be closest to which corner of the screen?
 - A. Top-left corner
 - B. Top-right corner
 - C. Bottom-left corner
 - D. Bottom-right corner

2. After you create a JFrame window and exit your main() function, what happens?
 - A. Your application exits and the window is destroyed
 - B. Your application will throw an exception if you did not close the JFrame first
 - C. Your application gets stuck in an infinite event loop
 - D. Your application will continue until the JFrame window itself is closed

3. How does your program receive events from a user button click?
 - A. Implement the buttonClicked() method on your main class
 - B. Your main() method will be called with specific arg[] parameters on each button click
 - C. Implement the ActionListener interface and add that object as a listener on the button object
 - D. You have to periodically check your JFrame object to see if there are any waiting events to process

4. If you add a JComponent to your JFrame or JPanel, and then lose track of that object reference, what are you prevented from doing later?
 - A. Receiving events generated by the object
 - B. Getting user-entered values from the object
 - C. Updating the object display text or content values
 - D. Identifying which of your multiple controls was clicked inside the actionPerformed() method

5. If you wanted to arrange controls on your JPanel in an evenly spaced array with a certain number of columns and rows, which Layout Manager would work best?

A. BorderLayout

B. GridLayout

C. FlowLayout

D. ArrayLayout

6. What kind of object can you add to your JFrame or JPanel client area?

A. Anything derived from JComponent

B. JLabel

C. JButton

D. All of these answers are correct

7. What was one limitation of the original Java AWT graphical library?

A. AWT produced user interfaces that were very slow

B. AWT was limited to the common elements present in major graphical operating systems

C. The AWT was not included in the core Java Class Library

D. None of these are limitations of AWT

8. Which line of code would add an empty 5-pixel border around the edge of a JPanel named myPanel?

A. `myPanel.setBorder(5,5,5,5);`

B. `myPanel.setEmptyBorder(5);`

C. `myPanel.setBorder(BorderFactory.createEmptyBorder(5,5,5,5));`

D. `BorderFactory.createEmptyBorder(myPanel,5,5,5,5);`

9. Which of the following Listener interfaces would you implement to receive events about checkboxes or radio buttons getting selected and de-selected?

A. ItemListener

B. KeyListener

C. ButtonListener

D. WindowListener

10. Why would you want to make this function call on your newly created JFrame?
setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE)

- A. The default JFrame behavior will just hide the window when you close it
- B. The default JFrame will not have any way for you to close the visible window
- C. This will allow you to exit the application from any other JFrame you create
- D. This will ensure all resources are cleaned up when the program exits

11. What set of classes can be used to add GUI elements to a Java program?

- A. Abstract Windowing Toolkit (AWT) Classes
- B. Java Swing Classes
- C. Both AWT and Java Swing classes
- D. None of these choices is correct

12. The AWT is limited to using only the common controls that are shared among the major graphical operating systems.

- A. true
- B. false

13. Who invented the Java Swing classes?

- A. Sun Microsystems
- B. The Oracle Corporation
- C. The Java Foundation
- D. Microsoft

14. Where should you create the main window for your application?

- A. In the main() function
- B. In the JFrame constructor
- C. In the LoadContent() method
- D. In the main program class constructor

15. In Swing, the placement of controls in the window client area is handled by an object called _____.

A. layout manager.

B. JFrame

C. JLabel

D. JComponent

16. All Swing UI controls inherit either directly or indirectly from the JComponent base class.

A. true

B. false

17. What line of code will send a simple message box pop-up to the user?

A. `JOptionPane.showMessageDialog(null,"This is my message");`

B. `JFrame.showMessageDialog(null,"This is my message");`

C. `JOptionPane.MessageBox(null,"This is my message");`

D. `JOptionPane.showMessageDialog("This is my message");`

18. Creating a JFrame object in the main() method is the best way to enable your program to easily receive events from graphical controls.

A. true

B. false

19. What object represents the client area in the window?

A. JPanel

B. JFrame

C. JObject

D. FlowLayout

20. What does it mean to create an event-driven program?

A. This means that certain functions within your code will execute when specific events occur.

B. This means that your program starts at the top of the main () method and executes each line of code sequentially.

C. This means the program does not include graphical elements.

D. This means your program is started with an event, and then executes sequentially until it exits.

"Swing Input Controls"

1. How do you ensure that a set of JRadioButton objects work together on the screen, automatically de-selecting one when another is selected?
 - A. Add them to your JPanel back-to-back
 - B. Create a ButtonGroup and call setGroup() on each JRadioButton object
 - C. Create a ButtonGroup and add() each JRadioButton object to the group
 - D. Create a Border around the JRadioButtons that should belong to one group

2. How do you know when the user is finished adding text to a JTextField control?
 - A. You could implement the ActionListener interface to receive an event when they press "Enter" on the JTextField
 - B. You could implement the ActionListener interface to receive an event when the user clicks a nearby JButton
 - C. Both of these will work
 - D. Neither of these will work

3. How would you initialize a JSpinner variable "mySpinner" with a JSpinner that allowed numbers between 0 and 100, used an increment of 5 when the arrow was pressed, and had a starting value of 50?
 - A. `mySpinner = new JSpinner(new SpinnerNumberModel(50,0,100,5));`
 - B. `call mySpinner.setModel(0,100,5,50);`
 - C. `mySpinner = new JSpinner(0,100,5,50);`
 - D. `SpinnerNumberModel.setBounds(mySpinner,50,0,100,5);`

4. How would you let the user view data in a JTextArea that is either to the side or below the currently visible area?
 - A. Enlarge the JTextArea size until it can display all content
 - B. Call the setScrollPane() method on the JTextArea and pass in a JScrollPane object
 - C. Add a JScrollPane object to your JPanel right after your JTextArea
 - D. Create a JScrollPane object to hold your JTextArea, and add the JScrollPane object to your JPanel

5. If you are creating a titled border to go around a group of components, on what object do you call `setBorder()` to add your border?

- A. `JPanel`
- B. Each of the `JComponents` contained within the border
- C. The Layout Manager in the `JPanel`
- D. All of these will work

6. If you are storing a `JList` selected item in a string variable, what do you have to do with the data returned by `JList.getSelectedValue()`?

- A. Cast it to a string because the `JList` stores Objects
- B. Just assign the returned string value directly to your variable
- C. Pull the first item out of the returned array and assign it to your variable
- D. Cast it to an Object because that's what the `JList` stores

7. What is an easy way to prompt the user for a single string value?

- A. `JOptionPane.showMessageDialog()`
- B. `JOptionPane.showInputDialog()`
- C. `JOptionPane.showStringDialog()`
- D. Use a custom-built window with your own `JLabel`, `JTextField`, and `JButton`

8. What is a difference between a `JList` and a `JComboBox` control?

- A. The `JComboBox` control will only display one item at a time
- B. The `JComboBox` control will only allow one selection at a time
- C. The `JComboBox` control can allow users to type in new entries
- D. All of these are correct

9. Which of the following are valid JList selection modes?

- A. You can select one item at a time
- B. You can select multiple items next to each other at a time
- C. You can select multiple items anywhere in the list
- D. All of these are valid

10. Which statement shows an array of 3 elements correctly initialized with string values?

- A. `String[] myArray = {cats, dogs, frogs};`
- B. `String[] myArray = {"cats", "dogs", "frogs"};`
- C. `String myArray[] = {"cats", "dogs", "frogs"};`
- D. `String myArray = {"cats", "dogs", "frogs"};`

11. What type of data is returned by an Input Dialog box?

- A. Only text data
- B. Only primitive data
- C. Either text or primitive data
- D. None of these answers is correct.

12. What is the difference between a JTextField and a JTextArea?

- A. A JTextField typically takes a single line of text. A JTextArea typically takes multiple lines of text.
- B. A JTextArea typically takes a single line of text. A JTextField typically takes multiple lines of text.
- C. There is no difference between these two controls.
- D. A JTextArea will only accept text input, a JTextField will accept text and primitive data.

13. If the user clicks the "Cancel" button on an Input Dialog, the returned result will be null.

A. true

B. false

14. Which line of code will create an array of Strings named "pets" with the values "dog", "cat", and "fish"?

A. `String[] pets = {"dog", "cat", "fish"};`

B. `String[] pets;`

C. `String[] pets = new pets("dog", "cat", "fish");`

D. `String[] pets = "dog", "cat", "fish";`

15. If the user is only allowed to choose one item in the list, how would you retrieve their selection?

A. `String userChoice = (String)myList.getSelectedValue();`

B. `String userChoice = myList.getSelectedValue();`

C. `String userChoice = myList.Text;`

D. `String userChoice = (String)myList.Text;`

16. By default, the JList will allow a user to select only one item from the list.

A. true

B. false

17. How do you check the current status of a JRadioButton control?

A. `bool currentSetting = myRadioButton.isSelected();`

B. `bool currentSetting = myRadioButton.isChecked();`

C. `bool currentSetting = myRadioButton.isDotted();`

D. `bool currentSetting = myRadioButton.isTrue();`

18. You must include a visual border around groups of radio buttons and check boxes.

A. true

B. false

19. Regardless of where you place radio buttons on your screen, if they are part of the same **ButtonGroup**, they will all work together as a group.

A. true

B. false

20 . What is an array?

A. Arrays contain a group of individual elements, with each element having the same data type.

B. A special numeric data type.

C. A primitive data type.

D. An array is a type of String data.