**44-542 Object Oriented Programming Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Exam 01 (100 points) KEY** *please print*

1. (5 pts) Suppose we have a **Dog** class with three private instance variables: **name** of type **String**, **breed** of type **String**, and **age** of type **int**. In addition, we have the constructor shown here.

**public Dog(String nameIn, String breedIn, int ageIn)**

**{**

**name = nameIn;**

**breed = breedIn;**

**age = ageIn;**

**}**

Write the body of the following no-arg constructor, ***using only a single line of code***. The no-arg constructor should assign the string **unknown** to **name** and **breed**, and **0** to **age**.

**public Dog()**

**{**

**this(“unknown“, “unknown“, 0);**

**}**

1. (5 pts) Assume we have a **String** variable named **str1** that has been assigned a value. Write a single Java statement that prints **long** if **str1** has more than 10 characters and **short** otherwise. Use the conditional operator (**? :**) in your solution.

**System.out.println(str1.length() > 10 ? "long" : "short");**

1. (5 pts) Suppose we have a class **Student** with private instance variable **age**. Method **setAge** sets the age of the student to the value passed in the parameter.

**public void setAge(int age)**

**{**

**this.age = age;**

**}**

Write the Javadoc comments for this method.

**/\*\***

**\* Sets the age of the student**

**\* @param age The value used to set the age of the student**

**\*/**

1. (8 pts) Suppose we have the following declarations:

**int a = 4;**

**int b = 7;**

**int c = 17;**

Evaluate the following expressions:

* 1. **a + c / b % a + b - c - 2 \* a** : \_\_-12\_\_\_\_\_\_\_
  2. **!(a > b || c < a)** : \_\_true\_\_\_\_\_\_\_

1. (5 pts) Write a single Java statement to declare and initialize a Scanner object named **in** to read from the keyboard.

**Scanner in = new Scanner(System.in);**

1. (10 pts) Write the code segment to do the following: Create an array of **int** values named **myInts** of size 8. For each entry in the array assign a value of **2 \* i**, where **i** is the index of the entry. So the entry at index 0 is 0, the entry at index 1 is 2, and so forth.

* Write only the code segment. Do not include any class or method headers.
* Your code for assigning values to entries in the array must work correctly if we change the size of the array.

**int[] myInts = new int[8];**

**for(int i = 0; i < myInts.length; i++)**

**{**

**myInts[i] = 2 \* i;**

**}**

1. (5 pts) Assume we have created an array list of integers named **myNumbers** and that we have filled the array list with at least 10 integers. (Do NOT write the code to do this – we are assuming this has already been done.)

Write a *single* Java statement that prints the value stored at index 7 in **myNumbers**.

**System.out.println(myNumbers.get(7));**

1. (4 pts) Find the output of the following code segment:

**String str1 = "JavaIsFun";**

**OUTPUT**

**false**

**true**

**false**

**true**

**String str2 = str1;**

**String str3 = new String ("JavaIsFun");**

**System.out.println(str1 != str2);**

**System.out.println(str1.equals(str2));**

**System.out.println(str2 == str3);**

**System.out.println(str2.equals(str3));**

**OUTPUT**

**outer = 4**

**inner = 4**

**num = 64**

**outer = 4**

**inner = 5**

**num = 36**

**outer = 4**

**inner = 6**

**num = 40**

**outer = 6**

**inner = 6**

**num = 48**

**outer = 6**

**inner = 7**

**num = 52**

**outer = 6**

**inner = 8**

**num = 56**

1. (12 pts) Find the output of the following code segment:

**for(int outer = 4; outer < 8; outer += 2)**

**{**

**for(int inner = outer; inner < outer + 3; inner++)**

**{**

**System.out.println("outer = " + outer);**

**System.out.println("inner = " + inner);**

**int num = inner + outer;**

**while(num < 35)**

**{**

**num \*= 2;**

**}**

**System.out.println("num = " + num);**

**}**

**}**

1. (15 pts) Trace the following code segment and find the output. Your trace must show a complete listing of every value assigned to x, y, and z.

**int x = 4;**

**OUTPUT**

**14 14 6**

**TRACE GOES HERE**

**x y z**

**4 19 1**

**6 18 -2**

**8 17 0**

**10 16 2**

**12 15 4**

**14 14 6**

**int y = 19;**

**int z = 1;**

**while(x < y)**

**{**

**x += 2;**

**y -= 1;**

**if(x + y < 25)**

**{**

**z -= 3;**

**} else**

**{**

**z += 2;**

**}**

**}**

**System.out.println(x + " " + y + " " + z);**

**Fill in the blanks (8 points – 4 points each).**

1. To make a duplicate copy of an array, use the \_\_\_\_\_**clone**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ method from the **Object** class.
2. In the header for method **main**, the word \_\_\_\_\_**static**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_means the JVM does not have to create an instance of the class in order to start the program.

**Multiple choice (18 points – 2 points each).**  Write the letter corresponding to the BEST correct answer.

***Select only ONE answer for each question. If you select more than one answer, the entire question will be counted as wrong.***

1. Which of the following is true of constructors?
   1. a constructor is the same as a method – there is no difference between the two
   2. when you define a class, you must always supply at least one constructor
   3. a class may have several constructors
   4. all of the above are true
2. **System.out** is an object of the \_\_\_\_\_ class.
   1. **System**
   2. **PrintWriter**
   3. **Printer**
   4. **PrintStream**
3. If **age** is a private instance variable in class **Dog**, and method **getAge** returns the age of a **Dog** object, then **getAge** is a(n) \_\_\_\_\_ method.
   1. accessor
   2. mutator
4. Syntax errors are detected at \_\_\_\_\_.
   1. run time
   2. compile time
5. To store the state of an object, use \_\_\_\_\_.
   1. methods
   2. constructors
   3. comments
   4. attributes
6. Which of the following is true of primitive types?
   1. they are not objects
   2. they have no methods
   3. variables for primitive types store a reference
   4. all of the above are true
   5. only a) and b) are true
7. To direct output to a file, use the \_\_\_\_\_ class.
   1. **System**
   2. **PrintWriter**
   3. **Printer**
   4. **PrintStream**
8. Suppose we have written a Java program named **HelloWorld.java**. To compile in a command prompt window, use the command \_\_\_\_\_.
   1. **java HelloWorld.java**
   2. **javac HelloWorld.java**
   3. **java HelloWorld**
   4. **javac HelloWorld**
9. In a command prompt window, the java command does which of the following?
   1. translates the java bytecode into machine code and runs the program
   2. compiles the source code
   3. translates the Java bytecode into machine code
   4. compiles the source code, translates the java bytecode into machine code, and runs the program