Exam Rules

- Show all your work. Your grade will be based on the work shown.
- The exam is closed book and closed notes.
- When taking the exam, you may have with you pens or pencils, and an 8 1/2” x 11” piece of paper filled with notes, programs, etc.
- You may not use a computer or calculator.
- All books and bags must be left at the front of the classroom during this exam.
- Do not open this exams until instructed to do so.

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1. True or False:

(a) ___ In Alice, a loop never stops if the condition remains false.
(b) ___ In Alice, an event can execute its statements only once.
(c) ___ An array is the only data structure available in Alice.
(d) ___ An object that responds when the event occurs is called a listener.
(e) ___ In Java, any objects, including arrays, can be stored in an array.
(f) ___ In Java, every class is automatically derived from the Object class.
(g) ___ In Java, the parent class can use all methods defined in the child class.
(h) ___ In Java, GUI components cannot contain other components.
(i) ___ In Java, a try block in the try-catch statement can have only one catch block.
(j) ___ In Java, an exception is thrown when a specified file is not found.

2. Line up the Alice statements with the corresponding statement in Java:

```
Mole moles[] = {mole, mole2, mole3, mole4, mole5, mole6, mole7, mole8}

while ( count < 10 ) {
    updateScore();
    count++;
}

world.drawCircle();

moles[index].move(0.5,0.25);

while ( count < 10 ) {
    updateScore();
    count = count + 2;
}

x = Integer.toString(y);

x = x % 2;

world.drawCircle(1,1);
```
3. What happens when the code is run?

(a) While true
   - Loop 3 times
   - drinkParrot.pivot = turn forward = 0.1 revolutions
   - drinkParrot.pivot = turn backward = 0.1 revolutions
   - drinkParrot.pivot = turn forward = 0.2 revolutions, duration = 2 seconds
   - drinkParrot.pivot = turn backward = 0.2 revolutions, duration = 1 second

(b) soldierList = toySoldier, toySoldier2, toySoldier3, toySoldier4
    - # Programming Project 5.5
    - Loop 5 times
      - For all soldierList, every item_from_soldierList together
        - world.moveSelectedSoldier soldier = item_from_soldierList
      - For all soldierList, every item_from_soldierList together
        - world.saluteSelectedSoldier soldier = item_from_soldierList
4. What is the output of the following code fragments:

(a) Output:
```java
int numtimes = 0;
while ( numtimes > 2 )
{
    System.out.print("Hi!");
    numtimes++;
}
System.out.print("Bye!");
```

(b) Output:
```java
boolean done = false;
int accum = 2;
while ( !done )
{
    if ( total > 20 )
    {
        done = true;
    }
    accum = 2*accum;
}
System.out.println(accum);
```

(c) Output:
```java
int i, j;
for ( i = 0 ; i < 4 ; i++)
{
    for ( j = 0 ; j < 4 ; j++)
    {
        System.out.print("*");
    }
    System.out.println();
}
```

(d) Output:
```java
int i, j;
for ( i = 0 ; i < 4 ; i++)
{
    for ( j = 0 ; j < 4 ; j++)
    {
        if ( (i+j)%2 == 0 )
        {
            System.out.print("*");
        }
        else
        {
            System.out.print("=");
        }
    }
    System.out.println();
}
5. What is the output?

(a) if ( ( 1 <= 1) && ( 0 > 10 ) )
   System.out.println("Yes");
else
   System.out.println("No");
Output: ___________________________

(b) boolean tobe = true;
    if ( tobe || !tobe )
       System.out.println("Yes");
    else
       System.out.println("No");
Output: ___________________________

(c) int x = 2, y = 3, z = 4;
    if ( x+y*z > 15 )
       System.out.println("Yes");
    else
       System.out.println("No");
Output: ___________________________

(d) int number = 7;
    boolean ispositive = ( number > 0 );
    boolean iseven = ( number % 2 == 0 );
    if ( ispositive && iseven )
       System.out.println("Yes");
    else
       System.out.println("No");
Output: ___________________________

(e) int year = 2000;
    if ((( year%4 == 0 && year%100 != 0 ) || ( year%400 == 0 ))
       System.out.println("Yes");
    else
       System.out.println("No");
Output: ___________________________
6. Assume the following class definition:

```java
public class SampleClass {
    public int number;
    public String message;
    public void print()
    {
        System.out.println(message + " " + number);
    }
    public void mystery()
    {
        int i;
        for ( i = 0 ; i < number ; i++ )
            System.out.print(message);
    }
}
```

and the following code has been executed:

```java
SampleClass first = new SampleClass();
SampleClass second, third;
first.number = 2;
first.message = "What’s up?";
second = new SampleClass();
second.number = 2*first.number;
second.message = first.message.substring(0,4);
third = first;
```

What is the output from the following statements?

(a) first.print();

Output: 

(b) first.mystery();

Output: 

(c) second.print();

Output: 

(d) second.mystery();

Output: 

(e) third.print();

Output: 

7. (a) Write a for-loop that prints out the even numbers from 0 to 10:
   0 2 4 6 8 10

(b) Write a while-loop that reads in exam scores from the user and keeps a running total of the scores. The loop ends the user enters a negative number. After the loop, you should print the average exam score. Include declarations for all variables used.
8. You have just been accepted a job with the Procurement Unit of the United Nations (located in Copenhagen). Your first assignment is to keep track of automobile purchases. Your predecessor, before quitting, began writing an `Automobile` class. Each of the methods of the class is proceeded by a comment that explains what the method should do. Fill in each method with the appropriate code:

```java
public class Automobile {

    public String maker; // The company who made the automobile
    public String model; // The model name (i.e. Explorer or Miata)
    public int year; // The year the car was made
    public int numPass; // Number of passengers car can legally carry
    public double price; // Price paid for car
    public double mpg; // Miles per gallon (i.e. gas mileage) of car

    /* Prints all the information about the car: */
    public void print() {

        /* Calculates the price per passenger */
        public double pricePerPass() {

            /* Using the mpg, calculates the range (how far) given the amount of gas */
            public double range(double gallonsOfGas) {

            }
        }
    }
}
```
9. Create a new class called Line that extends the abstract class Shape below. Your Line class should have properties for the endpoints of a line, a constructor, and a method draw().

```java
import java.awt.*;

public abstract class Shape {
    protected Color color;

    //Descendents of this class implement the draw method to draw the
    //particular shape in the specified graphics context.
    public abstract void draw(Graphics gc);
}
```
10. Write a **complete** Java program that asks the user for the name of a file and prints the contents of the file, **double spaced** to the screen: