ANSWER KEY
Exam 1
Computer Programming 230
Dr. St. John
Lehman College
City University of New York
Thursday, 1 October 2009

1. True or False:

   (a) T Everything in an Alice world is an object.
   (b) F Methods cannot call other methods.
   (c) T There are many predefined classes in Alice that the programmer can choose from.
   (d) F A variable can be used anywhere in the program, even before the declaration.
   (e) F The random number generation function only produces numbers between 0 and 1.
   (f) F Only one or two parameters can be accepted by a method.
   (g) F Comments in your program tell the computer how to run your program.
   (h) F Both portions of an `If/Else` statement must contain statements.
   (i) T An `If/Else` statement can be included in either part of another `If/Else` statement.
   (j) F The loop never stops if the condition remains false.

2. (a) Explain what a loop statement does:
   `A loop statement repeats a set of statements a fixed number of times, or while some condition holds.`
   (b) What is an infinite loop? Give an example.
   `An infinite loop is a loop that never stops. For example, a loop that starts "while true" will continue forever since the condition is always true.`

3. Write the Alice commands that will modify the `cow` object to be 50% transparent, blue, and riding in the `helicopter` object (ie set the vehicle to helicopter).

Properties	Answer

color
opacity
vehicle
skin texture
fillingStyle
pointOfView
is Showing
	`cow.opacity = 50%`
	`cow.color = blue`
	`cow.vehicle = helicopter`

4. To the right of each line of code, indicate the value of the logical expression after those lines have been executed.

(a) `Continue = true`

`Stop = false`

expression	True or False?
!Stop	TRUE

(b) `a = -1, b = 2, c = 5`

expression	True or False?
(c - 2) == 0	FALSE

(c) `(no change)`

expression	True or False?
a != 0	TRUE

(d) `Increment a by 1`

expression	True or False?
a == 0	TRUE

(e) `Increment b by 3`

expression	True or False?
b == c	TRUE

(f) `Set Value of a to b+c`

expression	True or False?
(a == 0) AND Stop	FALSE

(g) `Set Value of Stop to true`

expression	True or False?
!Stop OR Stop	TRUE

(h) (no change)

expression	True or False?
!Continue AND Stop	FALSE

(i) `(no change)`

expression	True or False?
(a $\geq$ b/2) AND (c $\geq$ b)	TRUE

(j) `(no change)`

expression	True or False?
(IEEERemainder of c/2) == 0	FALSE

5. Assume that the object `frog` has a method called `hop` with parameter, `distance` that controls how far forward the frog hops. Write the `my first method` that makes the frog hop 1 meter, 2 meters, and then 3 meters.

```
my first method:

  frog.hop(1 meter)
  frog.hop(2 meters)
  frog.hop(3 meters)
```

6. Write the `my first method` for a world that shows an astronaut bounding across the lunar landscape, then planting a flag, turning around, and heading back to his initial position.

   In addition, assume that the following methods have already been written for you:

```
astronaut.bound()
astronaut.plantFlag()
```

```
my first method:

  astronaut.bound()
  astronaut.plantFlag()
  astronaut.turn(left, 1/2 revolution)
  astronaut.bound()
```

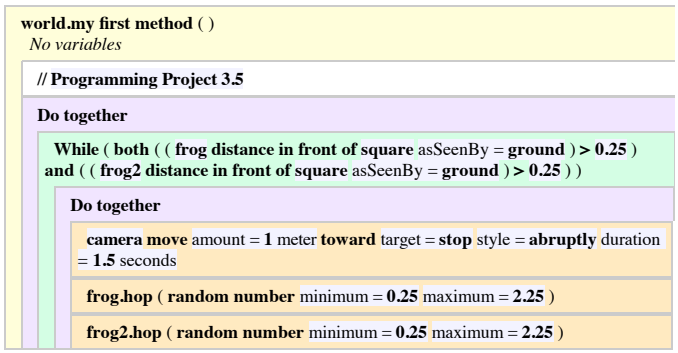
7. (a) Write an `If/Else` statement that causes an object called `bunny` to double in size 30% of the time.

```
If (choose true 0.3 (30%) of the time
  bunny.resize(2)
```

   (b) Write an `If/Else` statement that causes an object called `bunny` to turn red if it is within 2 meters of an an object called `stove`, otherwise the bunny should turn blue

```
If (bunny.isWithin(2meters, stove)
  bunny.color = red
Else
  bunny.color = blue
```

8. In words, what does the following loop do?




```
The frogs hop a random amount toward the square, until one
is within a 1/4 of a meter of the square, and then they stop.
The camera follows the frogs as they race towards the finish.
```

9. Write the `my first method` which contains a `Loop` statement that causes an object `skater` to spin in place 10 times. You may assume that the method `skater.spin` already exists.

```
my first method:

Loop 10 times
   skater.spin();
```

10. Write the method `DeliverCrate` method for the object `Blimp`. Your method should check to see if the Blimp is directly above the `Boat` using the `is Above` function. If it is, an object `Crate` should fall from the blimp to the boat (it may miss). The crate then "disappears" (ie becomes invisible and returns to the blimp). This should be repeated forever.

    (Suggestions: You may assume that the blimp is always 50 meters from the ocean. Further, making the blimp the "vehicle" for the crate will make it travel with the blimp.)

```
DeliverCrate()

  crate.vehicle = blimp
  while true
    if ( blimp.isAbove(Boat) )
      crate.opacity = 100%;
      crate.move(down, 50 meters, 2 seconds)
      crate.opacity = 0%;
      crate.move(up, 50 meters)
```