Answer Key
Exam 1
Computer Programming 230
Dr. St. John
Lehman College
City University of New York
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1. True or False:

   (a) T Properties describe the current state of an object.

   (b) F Methods cannot call other methods.

   (c) F Every program must have a comment.

   (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 10.

   (f) F Parameters can have only numeric values.

   (g) F Both portions of an `If/Else` statement must contain statements.

   (h) T An `If/Else` statement can be included in either part of another `If/Else` statement.

   (i) T If the condition is false, the statements inside the loop are never run.

   (j) F An event can execute its statements only once.

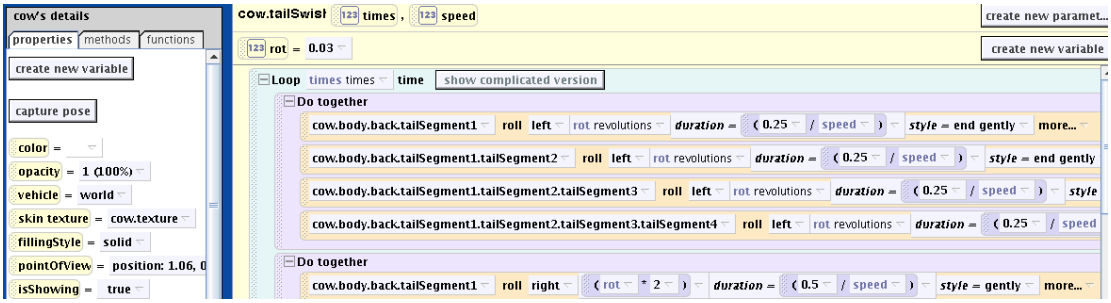
2. (a) What is a property? Give an example.

   `A property describes the current state of an object, such as its color and opacity.`

   (b) What is a method? Give an example.

   `A method is a set of statements that can be called (or invoked) whenever we want those statements to be executed. my first method is an example of a method.`

3. Indicate if the items are a `property`, a `variable` or a `parameter`:



cow.color	rot	times	speed	cow.vehicle
property	variable	parameter	parameter	property

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

(a) `More = true`

`Done = false`

expression	True or False?
!Done	True

(b) `a = -16, b = 0.5, c = 0`

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	False

(e) `Increment b by 3`

expression	True or False?
b == c	False

(f) `a set value to b+c`

expression	True or False?
(a == 0) AND Done	False

(g) `More set value to true`

expression	True or False?
!More OR More	True

(h) `(no change)`

expression	True or False?
!Done OR More	True

(i) `(no change)`

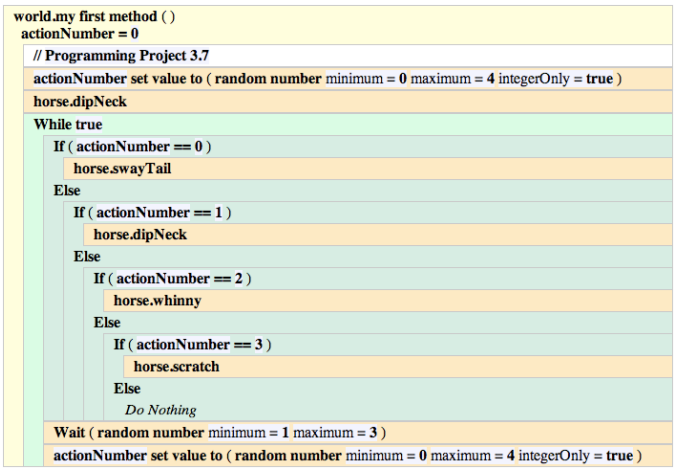
expression	True or False?
(a $\geq$ b) AND (c $\geq$ 2b)	False

(j) `(no change)`

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

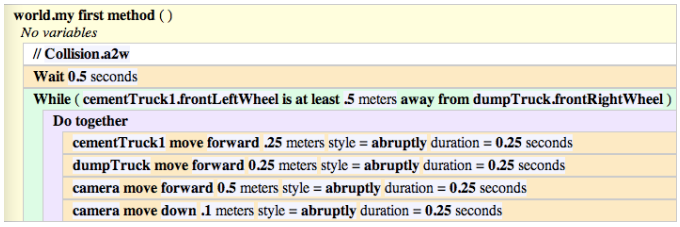
5. In words, what does the following do?

(a)



`The horse repeatedly does one of 4 actions: sway tail, dip neck, whinny, or scratch, chosen at random.`

(b)



`A cement truck and a dump truck drive towards each other until their front wheels are a half meter apart.`

6. (a) 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 is within 2 meters of stove )
  bunny.color set value to red
else
  bunny.color set value to blue
```

(b) Write a method, `bike.ChoosePath()` that has a bike turn left 75% of the time and right 25% of the time.

```
if ( choose true 75% of time )
  bike.turn(left, 1/4 revolution)
else
  bike.turn(right, 1/4 revolution)
```

7. Create an Alice world with a dragon in it. When you type 'F' the dragon should breathe fire. When you type 'S', a puff of smoke should appear. Both the fire and smoke should disappear after half a second.

`methods:`

`events:`

`When 'F' is pressed, dragon.fire()`

```
                                                    When 'S' is pressed, dragon.smoke()

dragon.fire()

  fire.opacity set value to 100%
  wait 0.5 seconds
  fire.opacity set value to 0%


dragon.smoke()

  smoke.opacity set value to 100%
  wait 0.5 seconds
  smoke.opacity set value to 0%
```

8. Write the `my first method` for a world that shows 10 airplanes taking off from an airport, one after another. Each airplane should drive to the start of the runway, wait one second and then take off. You may assume that a list, `airplanes` has already been set up and that all the planes are in position.

```
For all airplanes, every item_from_airplanes in order
  item_from_airplanes.move( forward, 10 meters )
  wait( 1 second )
  Do together
    item_from_airplanes.move( forward, 30 meters )
    item_from_airplanes.move( up, 30 meters )
```

9. Create an Alice world with a bunny and have the bunny repeatedly jump a random amount into the air and then back to the ground.

   - The bunny should stop his jumping after he has a jump of over 20 meters.
   - You should display, using 3DText the height of the current jump and the highest jump thus far.
   - At the end of the program, display the height of the highest jump.

   Assume that the bunny object, `Bugs`, and the 3DText objects, `CurrentJump` and `HighestJump`, as well as the number variables, `current` and `max`, have already been set up.

```
current set value to random number ( minimum=5, maximum= 30 )
max set value to current
while ( current <= 20 )
```

```
Bugs.move( up, current )
Bugs.move( down, current )
if ( current > max )
  max set value to current
CurrentJump.text set value to ( current as text )
HighestJump.text set value to ( max as text )
current set value to random number ( minimum=5, maximum= 30 )
```

10. Write the `my first method()` which displays the maximum height of the 10 objects in the array, `people`. You may assume that a number variable, `max`, and the `3D Text` object, `displayMax`, have already been set up.

```
my first method:

max set value to 0
Loop index from 0 up to (but not including) 10 times incrementing by 1
  if (item (index) from people) is larger than max
    max set value to (item (index) from people)
    displayMax.text set value to ( max as text )
```