University of California, Berkeley – College of Engineering
Department of Electrical Engineering and Computer Sciences
Spring 2011   Instructor: Dan Garcia   2011-02-14

CS10 Quest Rubric

Last Name	
First Name	
Student ID Number	
`cs10-` *Login First Letter*	a b c d e f g h i j k l m
`cs10-` *Login Last Letter*	a b c d e f g h i j k l m n o p q r s t u v w x y z
The name of your LAB TA (please circle)	**Glenn Luke Navin**
Name of the person to your Left	
Name of the person to your Right	
All my work is my own. I had no prior knowledge of the exam contents nor will I share the contents with others in CS10 who have not taken it yet. (please sign)	

Instructions

- Don't panic!
- This booklet contains 4 numbered pages including this cover page. Put all answers on these pages; don't hand in any stray pieces of paper.
- Please turn off all pagers, cell phones and beepers. Remove all hats and headphones.
- Fill in the front of this page and put your login on every sheet of paper.
- You have 50 minutes to complete this exam. The Quest is closed book, no computers, no PDAs, no cell phones, no calculators, but you are allowed one double-sided set of notes. There may be partial credit for incomplete answers; write as much of the solution as you can. When we provide a blank, please fit your answer within the space provided.

Question	1	2	3	4	5	6	7	8	TOTAL
Points	2	2	2	2	2	2	5	3	20
Score									

Question 1 : As a gift for your sweetie for Valentine's Day, you hire someone to build you a hot tub in your backyard. As you're about to enter the negotiation with the contractor, your sweetie reminds you: "don't forget the importance of functional abstraction!" IN ONE SENTENCE, what do you mean in this context? *(Hint: Imagine you writing the spec for the **Build-Hot-Tub** block)*

That you shouldn't tell the contractor HOW to build it, only WHAT you want via a clean specification with inputs (money, plans) and output (built hot tub). I.e., if they decided to build it with their bare hands, or hire a ton of helpers, or have it drop-shipped via airplane, or use one of their three genie wishes and have it magically appear, you shouldn't care.

2 pts - Saying "Don't tell them about HOW to build it, just tell them the input/output specs"
1 pts - Correctly describing abstraction, but not functional abstraction. It was very common to see answers that mentioned that abstraction allowed people to use the hot tub without knowing how hot tubs worked, which is abstraction, but not *functional* abstraction.
0 pts - No correct mention of abstraction.

Question 2 : Someone claims to have created the most realistic procedural skin surface texture ever made. They say "and here is our *Cornell Box* test to prove it." IN ONE SENTENCE, what are they about to show?

They're going to show you their simulation and real skin, and hopefully you won't be able to tell the difference!

2 pts - Saying anything about "Comparing a real to simulated skin surface"
1 pts - Describing what the Cornell Box was, but not how it was relevant to this problem.
0 pts - Not saying anything about the Cornell Box or comparing real to simulated skin.

Question 3 : The Supreme Court is wrestling with an issue regarding the state of California and video games. IN ONE SENTENCE, what is it?

It's deciding whether California's law banning the sale of video games to kids under 18 violates first amendment rights.

2 pts - Saying both elements: (1) California had banned the sale of video games to minors, (2) the court was wrestling with that decision violating first amendment rights.
1 pts - Saying one out of two things above.
0 pts - Not saying either of the relevant components of the answer.

Question 4 : *Blown to Bits* begins with a story of Tanya Rider who was rescued after 8 days of being trapped under her car. The book says you're supposed to say it's really a story about "bits." IN ONE SENTENCE, what were the specific bits that saved her life?

Her cell phone was sending bits of information indicating her last location, and the police used that to locate her (after suspecting her husband of foul play).

Question 5 : Finish the sentence: "To show you why BYOB can feel like it's a mostly _____ programming paradigm, I'd probably show you code with

_____".

- **Functional, a composition of reporter blocks that call other helper reporter blocks and have no assignment or local state**
- **Imperative, assignment statements with local state**
- **OOP, sprite-sprite communication via broadcast, message passing and explicit calling of blocks within sprites**
- **Declarative, lots of "what" factual statements, and a query, and no specific "how-to" code**

Question 6: Suppose we wish to compute the mathematical function `f(x) = 7 * (x - 5) * (x - 5)`, and we have already been given the block definition on the right. Your job is to define the three helper blocks below so that is computed correctly. Each of the blocks below should perform at MOST one computation of the form , , or . You don't have to draw images of the blocks, just the expression, e.g., `num + 99`
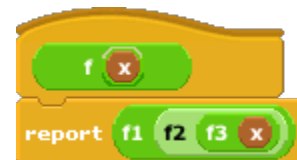

```
num * 7                    num * num                    num - 5
```

Login: `cs10-_____`

Question 7:

You wish to author a command **Sing Valentines Day Song** that takes as input a list of items, and has the sprite sing a song that describes what your true love gave you on that particular year (which, for year N, is N copies of the item in item N of the list, and all the things that were given last year). Example: If the list on the right were passed in as input, here's what song the sprite *should* sing to the user:

1	partridge in a pear tree
2	turtle doves
3	french hens

length: 3

> *On anniversary # 1 of Valentine's day, my true love gave to me...*
> *1 partridge in a pear tree*
> *On anniversary # 2 of Valentine's day, my true love gave to me...*
> ~~*2 turtle doves*~~
> ~~*1 partridge in a pear tree*~~
> *On anniversary # 3 of Valentine's day, my true love gave to me...*
> ~~*3 french hens*~~
> ~~*2 turtle doves*~~
> ~~*1 partridge in a pear tree*~~
> *Whew! that's a lot of gifts!*

a) What's the order of growth of **Sing Valentines Day Song** ? __**Quadratic** (1 point)__

Unfortunately, we have a bug in the code on the right:

b) Let's say we pass in the original 3-element list as input again. Indicate how the song above would change by crossing off whatever lines wouldn't be said (or changing them, or adding some, as necessary) in the box above.

```
Sing Valentines Day Song (gifts)
script variables (I) (day) ◄ ►
set day to 1
set I to day
repeat length of gifts
    say join On anniversary #
        join (day) of Valentines day, my true love gave to me... for 1
    secs
    repeat until I = 0
        say join I join  item I of gifts for 1 secs
        change I by -1
    change day by 1
say Whew, that's a lot of gifts! for 2 secs
```

said.

c) Indicate(by writing directly on the code) a small change that fixes the bug.

(moving `set [i] to [day]` beneath the `repeat [length of [gifts]]`)

```
Sing Valentines Day Song (gifts)

script variables (i) (day) ◄ ►
set [day ▼] to [1]
repeat (length of (gifts))
    say (join [On anniversary #]
         (join (day) [of Valentines day, my true love gave to me...])) for (1) secs
    set [i ▼] to (day)
    repeat until <(i) = [0]>
        say (join (i) (join [ ] (item (i) of (gifts)))) for (1) secs
        change [i ▼] by (-1)
    change [day ▼] by (1)
say [Whew, that's a lot of gifts!] for (2) secs
```

Question 8: You write the command that draws a "+" sign of a specified *size* and restores the original position of the sprite after it's done. For example, here's the stage before and after a call to : (the height of the stage is 360)
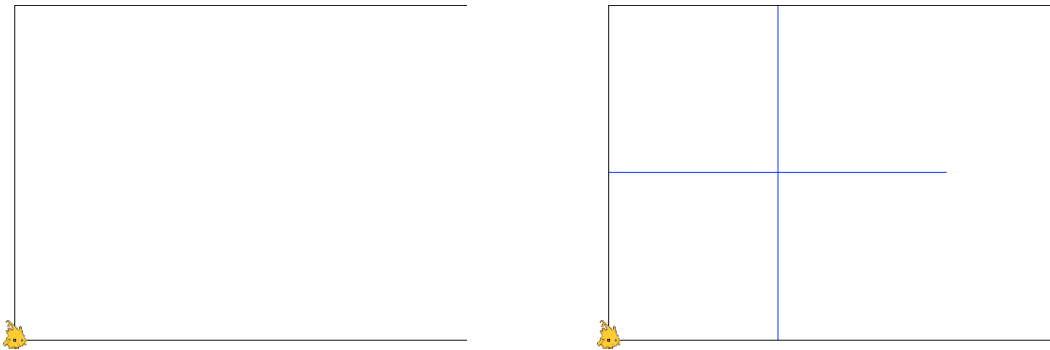
In the stage below, draw what would result if we started the sprite at the same lower-left corner, but instead of calling , we called the following script:
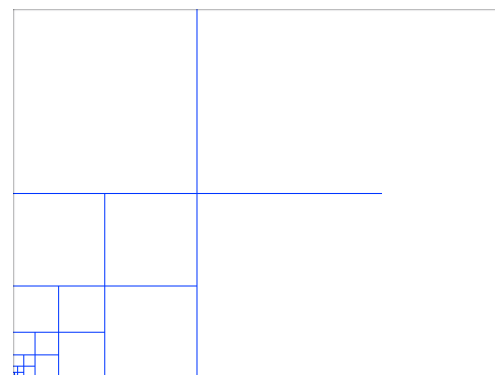
• 3 points for correct answer.
• 2 points if you had smaller plus'es, but going in the wrong direction (or overlayed on each other).
• 2 points if you drew the correct result, but said that it would clear the screen (instead of just hide the sprite) at the end.
• 1 point if it looked like you understood the problem, but your drawing hardly matched the correct answer.