### University of California, Berkeley - College of Engineering

Department of Electrical Engineering and Computer Sciences Instructor: Dan Garcia

2011-02-14

## **CS10 Quest**

Last Name	
First Name	
Student ID Number	
cs10- Login First Letter	abcdefghijklm
cs10- <b>Login Last Letter</b>	abcdefghijklm nopqrstuvwxyz
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

Spring 2011

- 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 they mean in this context? (Hint: Imagine you writing the spec for the Build-Hot-Tub block)

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?

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

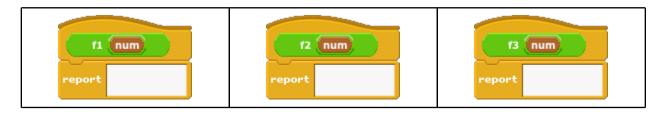
Question 4: Blown to Bits begins with a story of Tanya Rider who was rescued after 8 days of being trapped under her car. The book says you're supposed to say it's really a story about "bits." IN ONE SENTENCE, what were the specific bits that saved her life?

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

**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 1,000,000,000



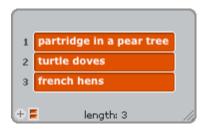
or OOO . You don't have to draw images of the blocks, just the expression, e.g., num + 99



Login: cs10-\_\_\_\_

#### Question 7:

You wish to author a command 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:



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!

Sing Valentines Day Song 🗏

a) What's the order of growth of

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

```
Sing Valentines Day Song gifts

script variables | day | |

set day | to 1 |

set | v to day

repeat length of gifts

join On anniversary #

say join day of Valentines day, my true love gave to me... for 1

secs

repeat until | = 0 |

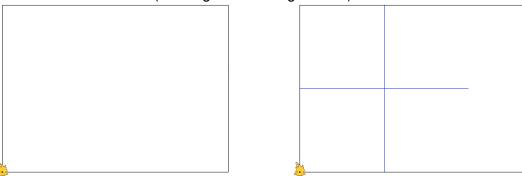
say join | join | item | of gifts | for 1 secs

change | v 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 compare the command of the sprite after it's done. For example, here's the stage before and after a call to compare the command 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 praw+ 360, we called the following script:

```
script variables size

set size v to 360

repeat until size < 1

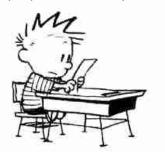
Draw+ size

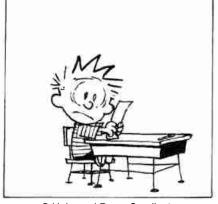
set size v to size / 2

hide
```



8. In the stage below, draw what would result if we started the sprite at the same lower-left corner, but instead of calling Draw+(360), we called the script below.







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# UCB CS10 (Spring 2011) Quest Answers



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**Question 1**: 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]

**Question 2 :** They're going to show you their simulation and real skin, and hopefully you won't be able to tell the difference!

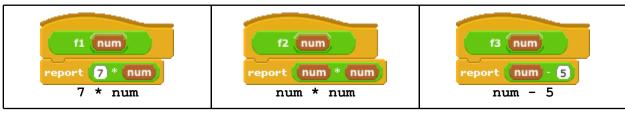
**Question 3**: It's deciding whether California's law banning the sale of video games to kids under 18 violates first amendment rights.

**Question 4**: 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:

- 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:



### Question 7:

a) Quadratic

b)

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!

c) Move the "set i to day" right above the "repeat until i = 0" block:

```
Sing Valentines Day Song gifts

script variables | day | |

set day | to 1|

repeat length of gifts

join On anniversary #

join day of Valentines day, my true love gave to me...

secs

set | | to day

repeat until | | = 0

say join | join | item | of gifts | for 1 secs

change | | by -1 |

change day | by 1 |

say Whew, that's a lot of gifts! for 2 secs
```

### **Question 8:**

