Fall 2011 CS10 Quest Answers

Question 1a : If you depend on the *implementation* of an abstraction (thus creating a "brittle" system), when the implementation *changes* (which it is free to do because it's below the line), your above-the-line system could break. E.g., we still say "step on the gas" which makes no sense because many electric cars have no gasoline involved!

For example, let's think of supermarkets. Their abstraction is that fresh fruit magically appears in it every so often. HOW it gets there (the implementation) can be via train, truck, local growers on bicycles, air-drop, tunnels to China, etc. Let's say you're the restaurant next door who needs the fresh fruit for your catering business. You shouldn't peek below the layer to know where it comes from and rely on it in your system. Let's say you do peek one day and find out the fruit all comes via train. One day you hear the inbound train tracks had a huge mudslide and no trains can come through. You cancel all your orders with your customers who were waiting for your fruit trays, assuming the supermarket won't get their fruit in for a while. However, it turns out that without you knowing it, the supermarket found a better local supplier (changing HOW it arrived below the line) and didn't use the train-based supplier. Now, without all your business, the supermarket isn't selling all that fruit and it's molding on the shelves, which is bad for them. So you lose, your customers lose, and the supermarket loses, all thanks to the fact that you relied on information below the line -- you deleteriously affected the whole ecosystem.

Another example is a car manufacturer who peeks below the line and finds out brakes are friction disc brakes (made by another company), and decides to use the excess heat it generates to heat the cabin of the car. Then you have customers who replace the friction brakes with cool "green" regenerative-braking ones that recharge the battery by engaging a mini-generator when the brakes are engaged. These people might take their cars to Tahoe and die of frostbite when hit with a sudden cold front and find out that their heaters no longer work.

Another example is that you might stop eating sausage if you actually saw how they made it!

2 pts - Mention that the system above might break when below the line things change, or that intellectual property of the system might be compromised
1 pts - Mention that they could change an aspect of the system inadvertently or that what's below could change without indicating what that might imply
0 pts - Simply mention that it stops revealing complexity and can be confusing. This doesn't make sense

Question 1b : The relative distances of the stations and the geographic accuracy.

2 pts - Mention either relative distance of the stations or geographic accuracy
0 pts - Mention neither

Question 2a : Rendering (30 frames per second -vs- hours per frame mean there are very different algorithms employed to render the scenes optimizing for speed and quality respectively).

2 or 0, right or wrong

Question 2b : All of them

½ for every circle

Question 3a : Three non-functions:

1. `Pick random () to ()` -- randomness means won't be same value every time
2. `change () by ()` -- a command (can tell by shape of the block)
3. `item (any) of ()` -- randomness means won't be same value every time

Every correct circle is +1, every incorrect circle is -1 (with potential of +1 bonus points if all correct)

Question 3b : Amazon over Borders, "today's largest video service (Netflix) is a software company", "today's dominant music companies (Apple, Spotify, Pandora) are software companies, today's fastest-growing entertainment companies are videogame makers", "Disney had to buy Pixar, a software company to remain relevant", photography, direct marketing (Google), the fastest-growing telecom is Skype, LinkedIn is the fastest-growing recruiting company, and others.

2 pts - Gives a good example from Andreesen's article, e.g., Amazon over Borders.
1 pts - Describes a reason *why* software is eating the world (e.g., takling about the Koans) without a specific example
0 pts - Doesn't describe why or give an example

Question 4a : a2,b4,c3, d1

½ for every correct match

Question 4b : a4,b2,c5,d1,e3,f6

½ for every correct match (with the potential of +1 bonus points if all correct)

Question 5a : He believes Facebook is there to monetize your social network.

2 pts - Specifically mention using the network to help Facebook's profits
1 pts - Mention that Facebook collects personal information on everyone, but doesn't mention it eventually intends to use them for profit
0 pts - Don't mention the 'network' aspect or the 'profit' aspect

Question 5b : "The store is paying them for information about their buying patterns"

2 pts - Specifically mention gathering their buying patterns
1 pts - Saying something correct about loyalty cards but NOT about collecting buying patterns
0 pts - Don't mention anything correct about loyalty cards

Question 6a :

Domain of `foo` (1st argument) : Boolean
Domain of `foo` (2nd argument) :Number
Range of `foo`: Boolean.

+1 for every correct match (with the potential of +1 bonus points if all correct)

Question 6b :
Domain of `bar` (1st argument) : Number
Domain of `bar` (2nd argument) :Boolean
Range of `bar`: Number.

+1 for every correct match (with the potential of +1 bonus points if all correct)

Question 7a : The duck keeps "ramming" at the ball from different random directions (100 units away). Every time the ball is hit, it gets bumped 10 units until it hits the border, at which point the play stops.

+1 for correctly specifying Duck
+1 for correctly specifying Ball
+1 for saying it terminates when it hits the border
-1 if they describe what each block does line by line (which we said not to do)

Question 7b : The duck keeps teasing the ball by randomly picking a point on the edge of the circle, and enticing the ball to visit him. Sisyphus the ball makes a valiant attempt, slides toward the duck, but always hits the electrified circle and shuffles back, rejected, to the center, only to have the duck move to another spot and the cycle continues forever.

+1 for correctly specifying Duck
+1 for correctly specifying Ball
+1 for saying it runs forever
-1 if they describe what each block does line by line (which we said not to do)

Question 8a : (a) 

does return TRUE when it should return FALSE. (I.e., it skips two instead of one, so it misses the even-odd pairs, here 3-vs-2, that might be unsorted)

+1 for answering TRUE for first question
+1 for answering FALSE for second question
+.5 for providing a list of the correct length (three)
+.5 for providing a list that triggers the bug

(b) To fix it, change the 

to 

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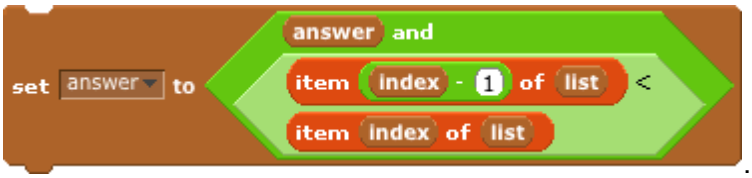
2 pts - clearly describing the change, either via code or conceptually. Must not make any other changes that break the program.
1 pt - either (a) correctly update the index block but provide additional code changes that break the program or (b) vaguely describe the change that needs to be made
0 pts - incorrectly identify the change that needs to be made.

Question 8b : (a) 

should return FALSE but does return TRUE. (i.e., it always returns the value of the last comparison, regardless of whatever happened before)

+1 for answering FALSE for first question
+1 for answering TRUE for second question
+.5 for providing a list of the correct length (three)
+.5 for providing a list that triggers the bug

(b) To fix it, change the 

to


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2 pts - clearly describing the change, either via code or conceptually. Multiple correct variations were both possible and common, and all working variations received credit. Must not make any other changes that break the program.
1 pt - either (a) correctly update the index block but provide additional code changes that break the program or (b) vaguely describe the change that needs to be made
0 pts - incorrectly identify the change that needs to be made.