# UC Berkeley's CS10 Spring 2018 Midterm 1: Instructor Dan Garcia 

Name of person on left (or aisle)
Name of person on right (or aisle)
Fill in the correct circles \& squares completely...like this: (select ONE) (select ALL that apply)

Question 1: Match each testing strategy with properties that describe it. (select ONE per row) 2 pts

|  | Unit | Regression | Integration | Black-box | Glass-box |
| ---: | :---: | :---: | :---: | :---: | :---: |
| Test as if you wrote it yourself and know insides | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ |
| Test as if you have no idea what is inside | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ |
| Test when you're putting it all together | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ |
| Test your block in isolation according to spec | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ |
| Run series of old tests after adding new feature | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ |



Question 2: If report (B)
reports true, what can you say about A and B? (select ALL that apply) 3pts

| $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ | $\square$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| A must be <br> equal to B | A must be <br> different from B | A must be <br> false | A must be <br> true | B must be <br> false | B must be <br> true | None of these |

...use this area for your scratch work, should you need it...

Question 3: Which one will say 20? The differences are only the say and final set blocks. (select ONE) 3pts

| $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ |
| :---: | :---: | :---: | :---: |
| script variables my age | script variables my age | script variables my age | None of these |
| set my age ${ }^{\text {v }}$ to 19 | set my age - to 19 | set my age - to 19 |  |
| Have Birthday my age | Have Birthday my age | Have Birthday my age |  |
| say my age | say age | say my age |  |
| Have Birthday age | Have Birthday age | Have Birthday age |  |
| set age to age + 1 | set age to age + 1 | $\text { set age to my age }+1$ |  |

$\qquad$
Sometimes getting the most performance out of a parallel system is all about scheduling things to happen at the right time. Here's an example. A boy scout is supposed to walk four nice old ladies across a street. It takes the ladies 10, 20, 30, and $\mathbf{5 0}$ seconds (respectively) to cross the street. Whenever two or more people are walking together, they have to walk at the speed of the slowest person in the group. It takes the boy scout only 1 second to walk back on his own. For all the calculations below, stop the timer the instant all four ladies have crossed; don't count the time at the end it takes the boy scout to return back to his original side of the street.
a) His scoutmaster has told him he can walk at most one person at a time. What's the fastest possible time to walk all the ladies across the street? (select ONE)

| O | - | - |  |  |  | - | $\bigcirc$ | $\bigcirc$ | - |  | - | $\bigcirc$ | $\bigcirc$ | O |  | O | $\bigcirc$ | $\bigcirc$ |  | - | , | O | O | O |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 41 | 42 | 43 | 44 | 51 | 52 | 53 | 54 | 61 | 62 | 63 | 64 | 71 | 72 | 73 | 74 | 81 | 82 | 83 | 84 | 111 | 112 | 113 | 114 | 115 |

.. use this area for your scratch work, should you need it..
b) His scoutmaster now tells him he can walk at most two people at a time, one on each arm. Remember, he needs to walk at the speed of the slowest person he's walking with.
What's the fastest possible time to walk the all the ladies across the street? (select ONE)

| $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 41 | 42 | 43 | 44 | 51 | 52 | 53 | 54 | 61 | 62 | 63 | 64 | 71 | 72 | 73 | 74 | 81 | 82 | 83 | 84 | 111 | 112 | 113 | 114 | 115 |

.. use this area for your scratch work, should you need it..
c) What if instead there were two boy scouts who could each walk at most one person at a time. What's the fastest possible time to walk the all the ladies across the street? (select ONE)

| $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ | $\bigcirc$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 41 | 42 | 43 | 44 | 51 | 52 | 53 | 54 | 61 | 62 | 63 | 64 | 71 | 72 | 73 | 74 | 81 | 82 | 83 | 84 | 111 | 112 | 113 | 114 | 115 |

.. use this area for your scratch work, should you need it..
d) Assume the old ladies have very kind manners and whenever they think they know the age of someone, and that person is older than them, they tell the boy scout that they won't start crossing until the older person crosses first. The problem is that their memories aren't so crisp and their memory of who is older is a little shaky. What could this result in? (select ALL that apply)

| Their preferences lead to the <br> optimal crossing times | Their preferences lead to the <br> slowest possible crossing <br> times | Their preferences lead to it <br> being impossible to get all of <br> them across the street | Their preferences lead to it <br> being impossible to get any of <br> them across the street. |
| :---: | :---: | :---: | :---: |

Question 5: Take my midterm (iteratively and recursively), please! (6 pts=3+3) SID: $\qquad$
Helper Block

| Do one question |
| :---: |
| No questions left $\rangle$ |

Description

Given the two helper blocks above, show us how to take an exam, iteratively and recursively. Fill in the slot in the row and column corresponding to the block you'd like to place in the code (you might not need all rows and cols).

Do one question from the exam
Return true if there are no questions left on the exam:


Question 6: Dude, where's my card? (6 pts = 4+2)
You have cards, numbered 1-N, which are shuffled (their order is scrambled), and placed into a list.
a) Fill in the circles to complete the block whose job is to report the index of a particular card in a shuffle.

b) We change numbers from (1) to length of shuffile to shuffile. What would the block now do?


