

UC Berkeley's CS10 Spring 2018 Midterm 2: Instructor Prof. Dan Garcia

Your Name (first last)

SID

Lab TA's Name

← Name of person on left (or aisle)

Name of person on right (or aisle) →

What's that Smell? Oh, it's Potpourri! (2 pts each for 6-11, low score dropped)

Fill in the correct circles & squares completely...like this: ● (select ONE) ■ (select ALL that apply)

Question 7: A predicate block (a function) takes in an arbitrary list and determines if it's sorted. You test it on 100 different lists and find it always works as promised. What do you know about the block? (select ONE)

- Since it's a function, if tested *again* on some of those 100 different lists, it *will* not work.
- Since it's a function, if tested *again* on some of those 100 different lists, it *may* not work.
- It *may* not work on the 101st list.
- It will work on all lists.
- None of these

Question 8: Which was mentioned in the *Computing in Education* lecture? ... (select ONE)

- xMOOC means "experimental" MOOC; they use this acronym to indicate a particularly innovative MOOC.
- Snap! would be labeled by Judah Shwartz as "courseware" since it's software used in a course.
- Prof Brian Harvey argued that the most important use of computing in education is Web Search.
- Sir Ken Robinson argued that there are two kinds of people: academic and non-academic.
- Sir Ken Robinson believed the current education system favors convergent (vs divergent) thinking.
- None of these

Question 9: What does ACM advocate is done to curb (or at least reduce) Algorithmic Bias? (select ONE)

- Make the algorithm creators *aware* of the potential biases.
- Make the algorithm creators *explain* how they work.
- Make the algorithm creators explain how they got the data used in their algorithms.
- Make the institutions that are using the algorithms responsible for the decisions the algorithms make.
- All of the above
- None of the above

Question 10: You were handed a plastic card in class. What superpower does it allow? (select ONE)

- You can now encode data in an unbreakable way, and by turning the card over, decode it easily.
- It provides a set of maxims to allow you to avoid algorithmic bias.
- It allows you to simulate a universal turing machine, as powerful a computer as can ever be invented.
- It's a tip sheet for creating unbreakable passwords, which is so important with all the hacking that occurs.

Question 11: Which of these are examples why your information footprint is larger than you think? (select ONE)

- You are filmed by digital security cameras when you innocently walk around the mall.
- Your supermarket purchasing habits are connected to you through the use of your rewards card.
- There's "metadata" that is stored with digital media that can reveal information about you.
- When you make a facebook post, even to a single person, it can be forwarded to the whole world.
- When your cell phone is powered on, your cell phone provider knows roughly where you are at all times.
- All of the above
- None of the above

Question 12: What is 10_{16} times 10_2 ? (select ONE)

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- | | | | | | | | | |
|----------|-----------|-----------|-----------|-----------|-----------|------------|------------|---------------|
| 4_{10} | 10_{10} | 16_{10} | 20_{10} | 30_{10} | 32_{10} | 100_{10} | 256_{10} | None of these |
|----------|-----------|-----------|-----------|-----------|-----------|------------|------------|---------------|

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

Question 13: We put the Fun in Funky Picture Drawing! (9 pts = 3+2+4)

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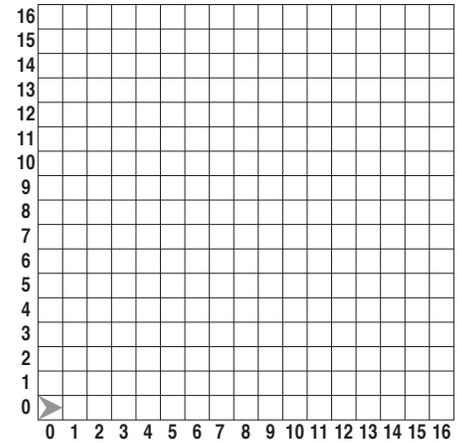
a) Shade in (completely!) *all* the pixels that are filled in after

Fun 16. The sprite starts at (0,0), facing right. The pen is already down.

Clarification: if the sprite were at (0,0) and moved 16 steps to the right, it would be at (16,0) and all pixels along the line from (0,0) through (16,0) would be shaded.

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Fun length
if length > 1
  move length steps
  turn 90 degrees
Fun length / 2
    
```



b) Which way is the sprite facing at the end of the call? (select ONE)

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Left	Right	Up	Down
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c) What is the running time of **Fun**? Assume **move** is a constant-time operation. (select ONE for each side)

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Constant	Logarithmic	Linear	Quadratic	Cubic	Exponential	Reasonable Time	Not Reasonable Time
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...use this area for your scratch work, should you need it...

Question 14: Commander Data at your service! (11 pts = 2+2+4+3)

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The CSforALL effort is taking effect countrywide and researchers want to know how well it's going. They collect the **name**, **gender**, **state** and **final score** (from 1-5) of every high school senior taking the new AP CS Principles course. Thankfully everyone has a different name! This is all stored in a central database called **DB** (a big, global Snap! list), in which each list entry is a different student record (which itself is just a list of all the values for each student). Here's an example of (a very small) **DB**; the actual **DB** has thousands of entries.

2	1	B	C	D
1	Maria Ortiz	Female	CA	5
2	Alan Turing	Male	NJ	4

item 1 of DB

1 Maria Ortiz
 2 Female
 3 CA
 4 5
 length: 4

The following four questions are independent. They each assume you have just read the setup and ask about a particular situation.

a) (for this Q only) If we wanted to know *how many Females took the test*, we could count the length of the output of which expression to process records from **DB**? (Select ONE)

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A single keep	A single map	All of the above	None of the above

b) (for this Q only) If we wanted to know *how many Females from TX took the test*, we could count the length of the output of which expression to process records from **DB**? (Select ONE)

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A single keep	A single map	All of the above	None of the above

c) (for this Q only) If they define the following:

Get AP score record :
 report item 4 of record

Convert number to English number
 report item number of list One Two Three Four Five

Convert number to English Get AP score list Maria-Ortiz Female CA 5 Five

Then what does the following do? (Select ONE)

map Convert number to English Get AP score over DB

- Overwrite **DB**, replacing every numerical AP score with its English equivalent
- Overwrite **DB**, replacing it with a list of the English equivalent of every AP score
- Return a new **DB**, but with every numerical AP score replaced with its English equivalent
- Return a list of the English equivalent of every AP score
- Cause an error based on a Domain and Range mismatch
- None of the Above

d) (for this Q only) Given *just DB* (and no other file, list, or knowledge of the world) what *couldn't* we determine? (Select ONE)

- The names of all the students who scored a 5
- The states who had no test-takers in it (if any)
- The states with the highest ratio of male students who scored a 2 (if any)
- The rank of Kansas among states who had the highest total number of test-takers
- Whether female students overall did worse than, better than, or the same as male students on the exam
- None of the above

