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

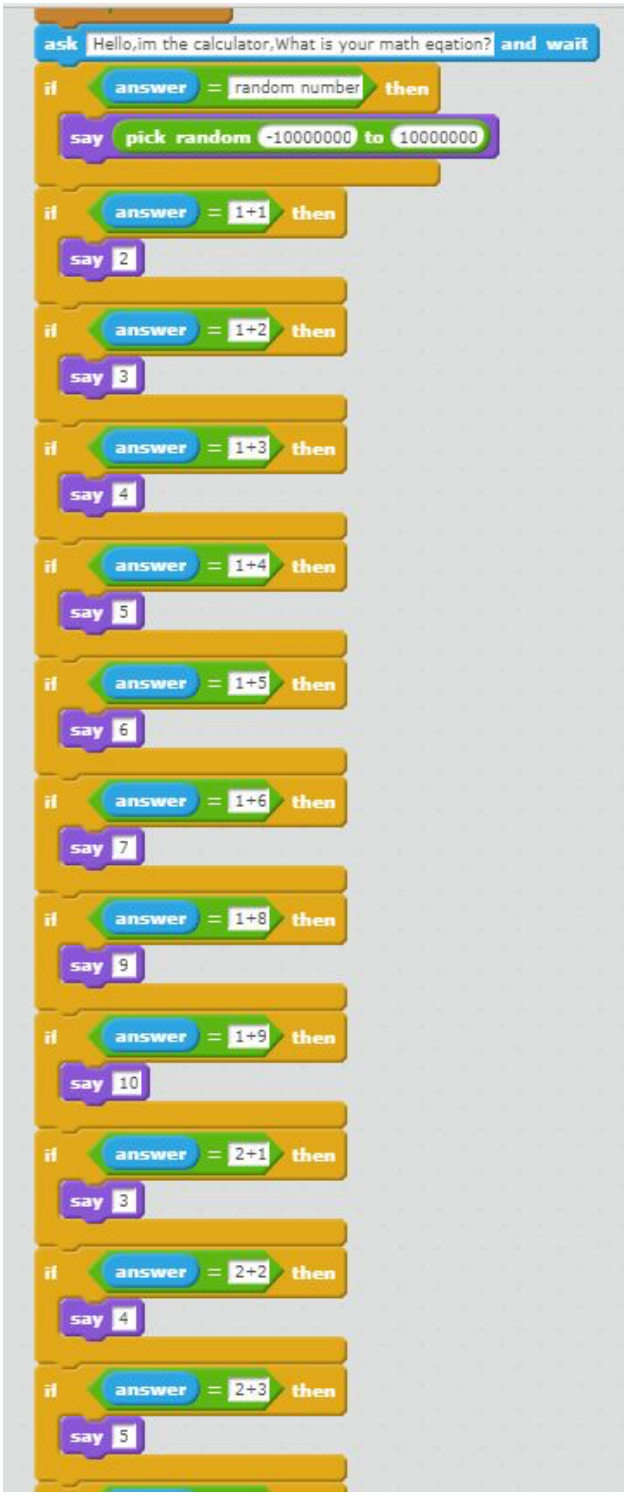
_____ _____ _____

Your Name (first last) *SID* *Lab TA's Name*

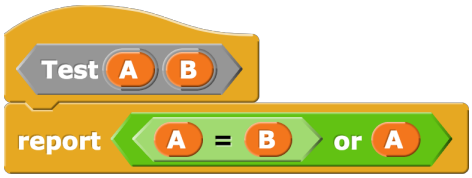
_____ _____

← Name of person on left (or aisle) *Name of person on right (or aisle) →*

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



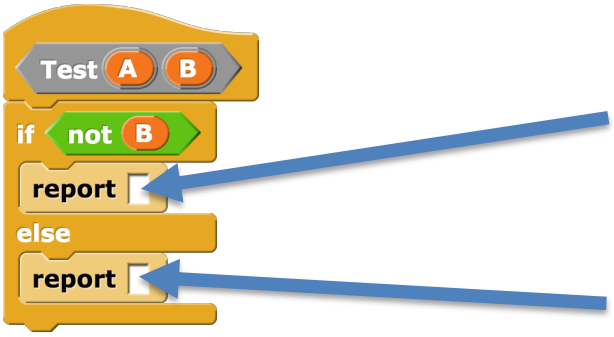
(The block on the right is used for Questions 10 & 11; 2 pts each)



Question 10: If the output from **`Test`** is false, which can you say *for sure*? **`A`** and **`B`** are Booleans. (select ALL that apply)

☐ **`A`** must be true	☐ **`B`** must be true	☐ **`A`** must be false	☐ **`B`** must be false	☐ None of these

Question 11: Fill in the blanks so the predicate is the same as the original **`Test`** block. (select ONE from each)

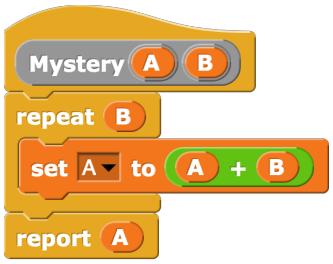


○ **`true`**	○ **`false`**	○ **`A`**	○ **`not A`**	○ **`B`**	○ **`not B`**

○ **`true`**	○ **`false`**	○ **`A`**	○ **`not A`**	○ **`B`**	○ **`not B`**

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

Question 12: What does **`Mystery`** report,
if B is a non-negative integer (i.e., 0, 1, 2, …)? (select ONE, 4 pts)



○ $A+B$	○ $A \times B$	○ A^B	○ B^A	○ B^2	○ $A+B^B$	○ $A+B^A$	○ $A+B^2$	○ The sum of all the numbers from A to B	○ Error	○ Infinite Loop

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

Question 13: What is $256_{10} + 10000_2$? (select ONE, 2 pts) *Hint:* $16_{10} \times 16_{10} = 256_{10}$

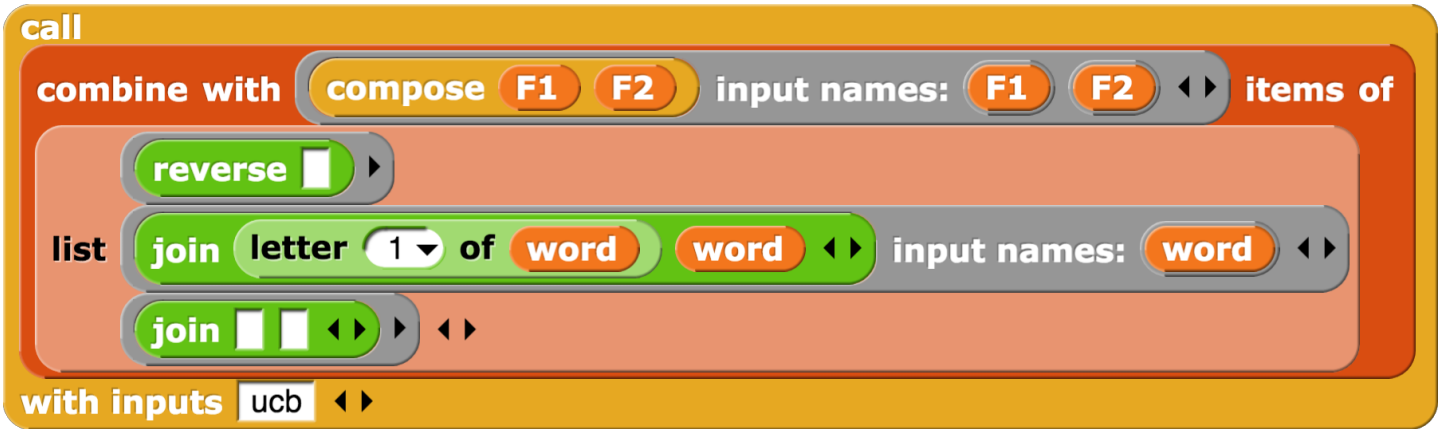
○ AF_{16}	○ FA_{16}	○ FF_{16}	○ 110_{16}	○ 111_{16}	○ 210_{16}	○ 10256_{16}	○ 12560_{16}	○ 22560_{16}	○ None of these

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

Question 14: *Potpourri Part II* (10 pts=2*5) SID _____

a) What does the **`combine`** expression return? (Choose ONE)

○ abcd	○ abdc	○ acbd	○ acdb	○ adbc	○ adcb	○ bacd	○ badc	○ bcad	○ bcda	○ bdac	○ bdca	○ cabd	○ cadb	○ cbad	○ cbda	○ cdab	○ cdba	○ dabc	○ dacb	○ dbac	○ dbca	○ dcab	○ dcba



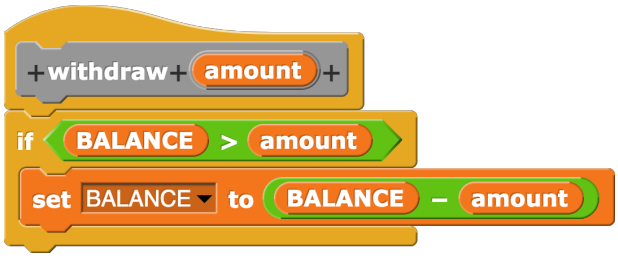
b) What does the expression above return, taken straight from lecture with a different input? (Choose ONE)

○ laclacc	○ bcu uucb ucb ucb	○ bcuubcuu	○ bcubcuu	○ bbcubbcu	○ bbcubcu

c) The developer of Snap*! removes the restriction* that two scripts cannot run at the same time, claiming it will increase performance. *What could now happen?* Note: this problem is independent of the block below. (Choose ALL that apply)

- ☐ Abstraction
- ☐ Deadlock
- ☐ Livelock
- ☐ Race Condition
- ☐ Turing Completeness

d) In fact to show this, you set up a fake bank with $100 in it, and have TWO people simultaneously take $10 out of their accounts using the block above. *What are the possible values of* **`BALANCE`** *afterward?* (choose ALL that apply)



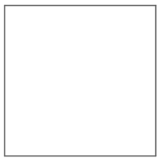
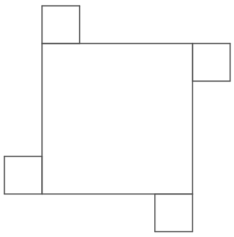
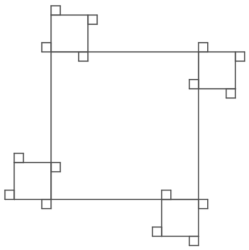
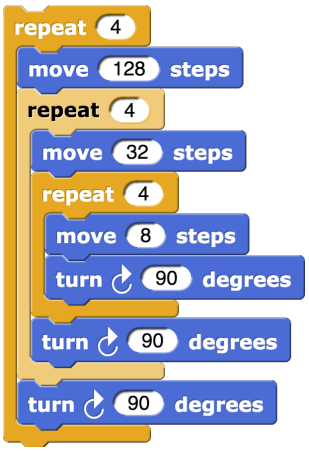
☐ $0	☐ $80	☐ $90	☐ $100	☐ $110	☐ $120

e) In computational science, *computers are used to understand things that are* _____ *for experiments*: (choose ONE)

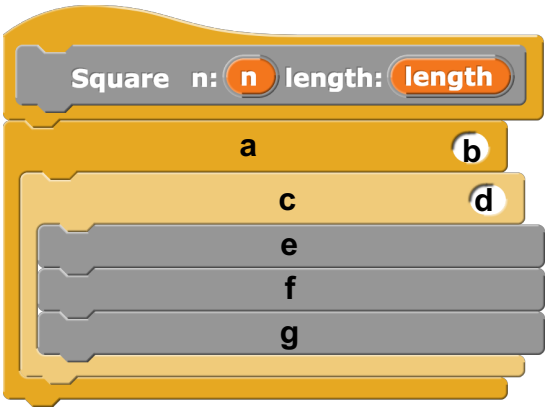
○ too data-intensive	○ too trivial	○ too cheap	○ too slow	○ too experimental	○ too random

Question 15: *We put the fun in functional programming…* (10 pts) SID: _____

We start with our standard square and add a fun flourish before we make our turn. The sprite starts at the top left of the biggest square facing right. Code and pictures.

Fill in the slot in the row and column corresponding to the expression or block you'd like to place in the code below. Slots **b** and **d** are round but they can take a hexagonal-shaped predicate if that's what you need. (Select ONE per column; you might not need all rows).



a	b	c	d	e	f	g	
○	○	○	○	○	○	○	`repeat`
○	○	○	○	○	○	○	`if`
○	○	○	○	○	○	○	`4`
○	○	○	○	○	○	○	n = 0
○	○	○	○	○	○	○	n = 1
○	○	○	○	○	○	○	n > 0
○	○	○	○	○	○	○	n > 1
○	○	○	○	○	○	○	move length steps
○	○	○	○	○	○	○	move n steps
○	○	○	○	○	○	○	turn 90 degrees
○	○	○	○	○	○	○	Square n: n – 1 length: length
○	○	○	○	○	○	○	Square n: n length: length
○	○	○	○	○	○	○	Square n: n + 1 length: length
○	○	○	○	○	○	○	Square n: n – 1 length: length / 4
○	○	○	○	○	○	○	Square n: n length: length / 4
○	○	○	○	○	○	○	Square n: n + 1 length: length / 4