

UC Berkeley's CS10 Spring 2017 Quest – Instructor 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, we drop lowest two)

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

Question 1: How does calling the right pedal in a car the “gas pedal” relate to Abstraction best? (select ONE)

- ☐ You're not supposed to know how things are done *below the line*, it's an *Abstraction Violation*.
- ☐ The gas pedal allows you to *remove detail* about the operation of the car.
- ☐ The pedal is a *generalization* of many different styles of pedals through the years.
- ☐ The pedal follows the *specification* required for delivering gasoline to the engine.

Question 2: What is the *decimal* value of the expression: $1E_{16}$ (hex) \div 10_2 (binary)? (select ONE)

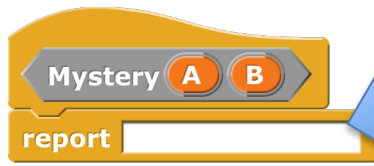
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10	11	12	13	14	15	16	17	18	19	20

(The image on the far right is used for Questions 3 & 4)

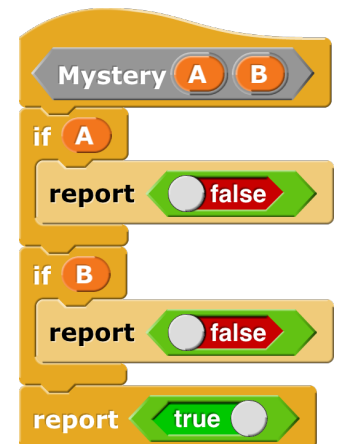
Question 3: If the output from **mystery** is true, which can you say *for sure*? (select ALL that apply)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A must be true	B must be true	A must be false	B must be false	Nothing

Question 4: You realize you could replace the *entire* body of the predicate with a single **report** (as shown below). What could go in that report block? (select ALL that apply)



- ☐ A and B
- ☐ A or B
- ☐ not A and not B
- ☐ not A or not B
- ☐ not (A or B)
- ☐ not (A and B)



Question 5: Which of the following is a *false* statement about Algorithms? (select ONE)

- ☐ Algorithms can be worth *billions* of dollars
- ☐ Paul Revere practiced *selection*
- ☐ You learned your first algorithm *before you could speak*
- ☐ Proving algorithms are correct is *easy*
- ☐ Algorithms can *adapt*, like a living thing

Question 6: Given a list (of size N) of ID numbers *well in advance*, and infinite storage, what's the running time of an algorithm to find whether *two different* IDs are in the list? (select ALL that apply)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Constant	Logarithmic	Linear	Quadratic	Exponential	Reasonable Time	Not Reasonable Time

Question 7: Given the following error-free expression `Foo join [hello] B contains A`, what is your best guess as to the *Domain* and *Range* of `Foo`? (select ALL that apply)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
sentences	booleans	lists	sentences	booleans	lists
The Domain of Foo is...			The Range of Foo is...		

Question 8,9,10: どうもありがとうミスターロボット *Dōmo arigatō, Mr. Roboto...* (3,1,1 pts) SID: _____

Here are helper blocks for control and sensing of a robot, starting in the bottom center of the maze, facing up.

move forward	rotate left	can move left? can move forward?
The robot moves <i>INPUT</i> squares forward in the direction it's facing.	The robot turns counterclockwise (in-place).	Reports true if the robot has a free (white) square to its {left, front}; otherwise reports false.

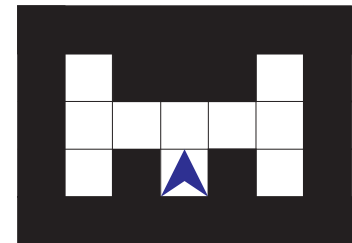
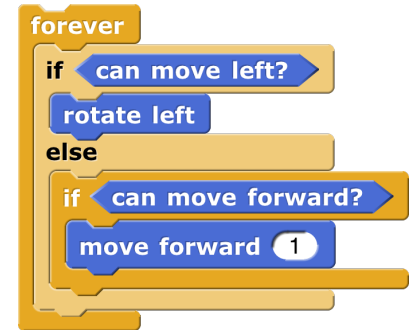
Question 8: We control the robot using the **forever** block on the right. On the maze below the code, *fully shade in all the squares* the robot will visit.

Question 9: After 100 iterations, does the robot continue to move or stay in place? (select ONE)

☐ Continues to move ☐ Stays in place

Question 10: Does the robot ever move into a black (non-free) square? (select ONE)

☐ No ☐ Yes



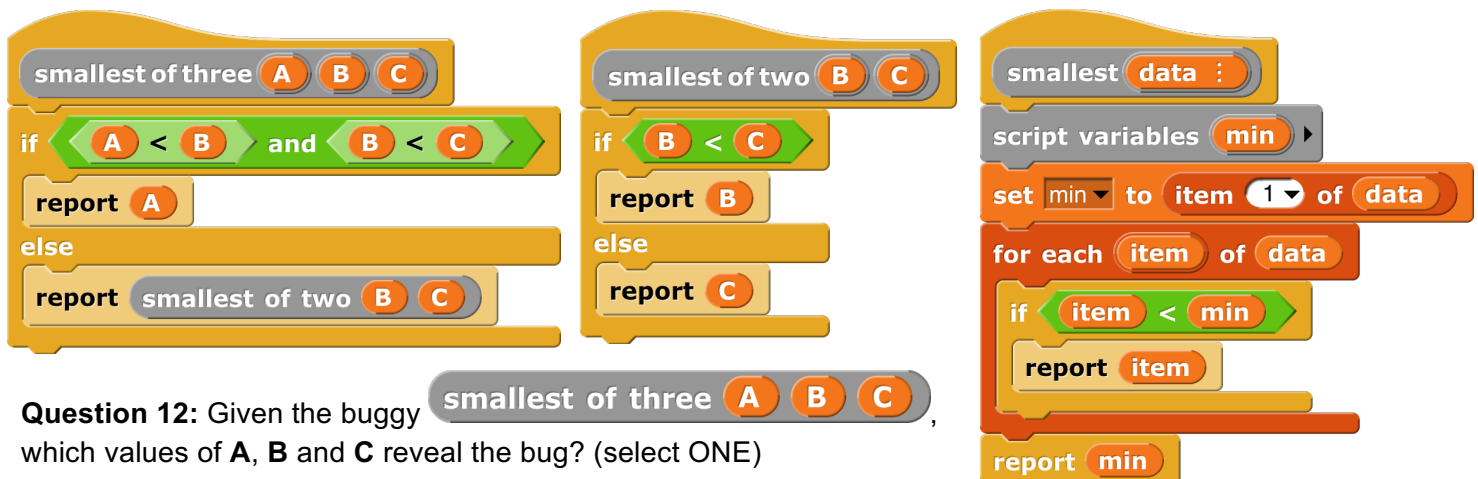
Question 11: Beethoven was a tremendous composer... (2 pts)
These blocks operate on numbers; examples are shown:

Block	Description	Examples
concat1	Concatenates a 1 to the end of the number.	concat1 123 → 1231
reverse	Reverses the numbers. (leading zeros go away)	reverse 1230 → 321
plus1	Adds 1 to the number.	plus1 123 → 124

What is **reverse** **plus1** **concat1** 12 ? (select ONE)

☐ 122 ☐ 131 ☐ 212 ☐ 221 ☐ 222 ☐ 311

Question 12,13,14: The meek shall inherit the earth... (2,4,2 pts) The left two blocks attempt to find the smallest of three numbers; the right block tries to find the smallest item of a number list whose length ≥ 1 .



Question 12: Given the buggy **smallest of three** **A** **B** **C**, which values of **A**, **B** and **C** reveal the bug? (select ONE)

- ☐ A=1, B=2, C=3
- ☐ A=1, B=3, C=2
- ☐ A=2, B=1, C=3
- ☐ A=2, B=3, C=1
- ☐ A=3, B=1, C=2
- ☐ A=3, B=2, C=1

Question 13: Which are true about **smallest**? (select ALL that apply)

- ☐ It always works as advertised
- ☐ It works if the items are sorted in *descending* order, biggest to smallest
- ☐ It works when the first element (which we'll call the "head") is smallest
- ☐ It works when the first element smaller than the head is the smallest element

Question 14: Running time of **smallest**? (select ONE)

☐ Constant ☐ Logarithmic ☐ Linear ☐ Quadratic ☐ Cubic ☐ Exponential