

CS39n - Midterm - DIRECTIONS

10/26/2009 7-10pm

Please read all instructions carefully. This exam consists of two parts. The first part should be completed without the use of Scratch and your answers should be written on the paper titled "CS39n - Midterm - PART 1". Please note, Part 1 is significantly shorter than Part 2. Once you complete Part 1, please turn it in before continuing on to Part 2. The second part of the exam will be done on the computer. The exam and all files are available from the BSpace assignments tab. This exam is out of 60 points, but there are 66 points to earn. We will drop your lowest-scoring question.

Name:	Instructional login (eg, cs39n-ab):
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(6 pts)	Prob 1	
(4 pts)	Prob 2	
(5 pts)	Prob 3	
(5 pts)	Prob 4	
(5 pts)	Prob 5	
(5 pts)	Prob 6	
(5 pts)	Prob 7	
(6 pts)	Prob 8	
(5 pts)	Prob 9	
(5 pts)	Prob 10	
(5 pts)	Prob 11	
(5 pts)	Prob 12	
(5 pts)	Prob 13	

TOTAL:

CS39n - Midterm - PART 1

Login: cs39n- _____

1. (6 points) The dot and arrow show the current position and direction of the character BEFORE the script is run. Draw the shape traced by each of the following scripts based upon the start arrows drawn below. Please show the final position and direction of the character by drawing an arrow like is shown for the start. If the arrow ends up at the same position please indicate that with a note that includes the final direction of the arrow. You may assume that side-length is some positive number that allows the shapes to be drawn on this page.

a)

```
pen down
change x by side-length
change y by side-length
change x by 0 - side-length
change y by 0 - side-length
```



b)

```
pen down
turn 45 degrees
change x by side-length
change y by side-length
change x by 0 - side-length
change y by 0 - side-length
```



c)

```
pen down
repeat 2
  change x by side-length
  turn 90 degrees
  change y by side-length
  turn 90 degrees
```



d)

```
pen down
turn 45 degrees
repeat 2
  change x by side-length
  turn 90 degrees
  change y by side-length
  turn 90 degrees
```



e)

```
pen down
repeat 4
  move side-length steps
  turn 90 degrees
```



f)

```
pen down
turn 45 degrees
repeat 4
  move side-length steps
  turn 90 degrees
```



2. (4 points) What is the value of the variable `result` after the following script is run?

```
when clicked
  set result to 0
  set index to 0
  repeat until 5 < index
    change index by 2
    set result to join index result
```

CS39n - Midterm - PART 2

10/26/2009 7-10pm

This portion of the exam involves using Scratch and Scratch BYOB. As part of the exam you will modify and resubmit the following Scratch files that are available on BSpace.

- ShortPlay.sb
- RockPaperScissors.sb
- InterestRate.sb

We have provided a file on BSpace for you to type your answer for each short answer question. All of your short answers should go in a file called "ShortAnswers.doc".

Note there may be multiple correct answers. You are welcome to use any materials on the cs39n website: inst.eecs.berkeley.edu/~cs39n/fa09/ You may watch lecture videos, however you may not use the rest of the internet!

Programming:

3. (5 points) We want you to make a short play. We have provided the file ShortPlay.sb in BSpace. We have also provided the file ShortPlay_example.mov in BSpace. Using Scratch you should modify the file ShortPlay.sb to match the behavior in ShortPlay_example.mov.

- When you click on the green flag the characters should go to their start positions. (These start positions are provided in the file ShortPlay.sb and should not be changed.)
- When you click on the green flag the cat should animate walking right until it touches the bananas. (The animation of the cat should be similar to that shown in the video, but it doesn't need to look realistic.)
- When the cat touches the bananas the monkey should say "Get away from my bananas!"

4. (5 points) We want you to modify the rock-paper-scissors program to make use of lists. We have provided the file RockPaperScissors.sb in BSpace. Using Scratch, please modify it to use lists. Your final program should have the same behavior in Scratch but should make use of lists to reduce the number of blocks necessary.

5. (5 points) We want you to provide the code for a new block in Scratch BYOB to calculate interest rate. We have provided the file InterestRate.sb in BSpace. There is currently no code provided in the file InterestRate.sb. It should be modified to behave as described below:

A certain bank uses the following table as their guide in calculating interest. You should make a block named "interest rate" that takes as input the amount of money and reports the interest rate as "3%", "2.5%", "2%" or "1%". For example if the input to the block "interest rate" was 7000, you should return "2.5%". You may assume that the your new block "interest rate" will only be called with numbers greater than 0 and will never include a "\$".

Include sample test calls to the new block to show that it works.

AMOUNT OF MONEY IN BANK ACCOUNT	INTEREST RATE
greater than 10000	3%
between 3333 and 10000	2.5%
between 1000 and 3333	2%
less than 1000	1%

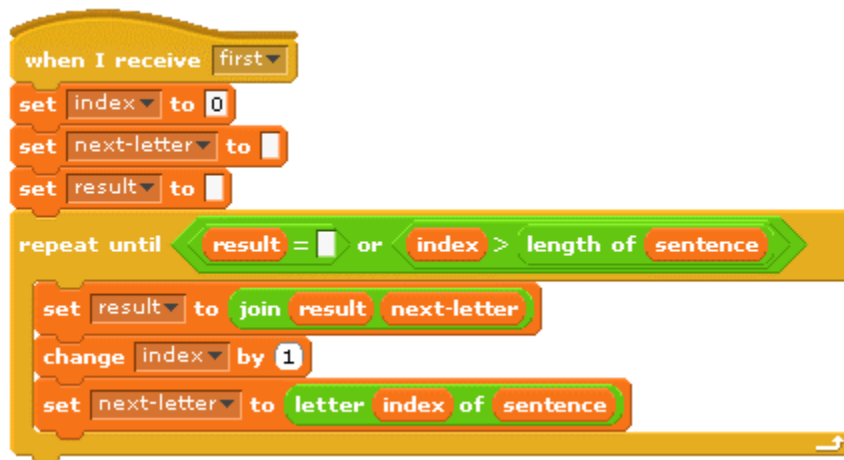
Short Answer: All of your short answers should go in a file called "ShortAnswers.doc"

6. (5 points) Aside from the reasons we discussed in class (simulations for training and Luis von Ahn's games with a purpose), what is a great use of games, in terms of a benefit to society / individuals?

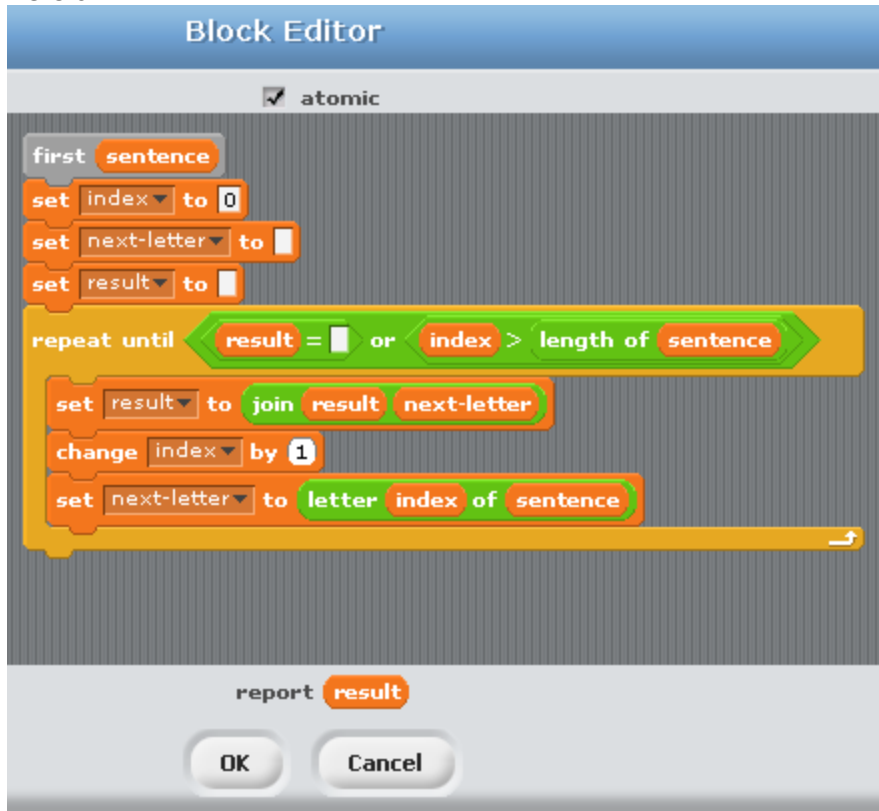
7. (5 points) What is a disadvantage of duplicating a sprite many times? If you could redesign Scratch, how would you eliminate this problem?

8. (6 points) We have written two identical versions of "first". You call Version 1 by setting the variable "sentence" and then broadcast "first". The script that receives the message "first" puts the first word of "sentence" in the variable "result". Version 2 is a block that takes as an argument the sentence and reports the first word of that sentence.

Version 1:



Version 2:



We want a character to say the first word in the sentence ("Go" in the examples below). Other characters may also be using first.

a)



This works and the character says "Go" (circle your answer)

Always Sometimes Never

Explain why:

b)



This works and the character says "Go" (circle your answer)

Always Sometimes Never

Explain why:

c)



```
set sentence to Go Bears!  
say first sentence for 2 secs
```

This works and the character says "Go" (circle your answer)

Always Sometimes Never

Explain why:

9. (5 points) In a hybrid car, the electric motor can also serve as a generator to recharge the battery, by letting the wheels turn the motor instead of the other way around. This takes energy away from the wheels, slowing the car. To make this happen, you push the brake pedal. But you're not really applying the brakes -- you're charging the battery from the car's energy of motion. So why didn't they make a separate control for this, instead of giving an extra meaning to the brake pedal?

10. (5 points) "I don't do anything I'm ashamed of; why should I worry about privacy?" Give at least two answers to that question.

11. (5 points) What's the difference between strongly and weakly solving a game?

12. (5 points) In the future, when computers have thousands of cores (simultaneous processing modules), which of the programming paradigms will be easiest to automatically parallelize and why?

13. (5 points) We've talked about the positive benefits of the applications that changed the world. Choose one of the applications that we've talked about and describe its negative side-effects.