CS10 Fall 2016 Midterm 1 Answers

Question 1: What happened in 2005 that *caused computer chip manufacturers to "go parallel"*? "Computer chip power density started approaching that of a nuclear reactor and we couldn't cool them down."

Question 2: Consider the AI problem of *Natural Language Processing* of an audio track in which the user says the two words: "artificial <audio-garbled>". The three most common words the user could have wanted to say next are "intelligence", "limb" and "flavoring". The system chooses the one… with the highest PRODUCT of the n-gram probability and the audio proximity probability.

Question 3: Sir Ken Robinson, the famed British author and speaker argues…

☐ we shouldn't be "anesthetizing" our students (with ADHD medicines), we should be "waking them up"! (YEP!)

☐ we've got to go in a completely separate direction from standardization and standardized curriculums. (YEP!)

☐ we should be separating male students from female students so they can each focus better. (NOPE)

☐ most great learning happens *individually*, which is the "stuff of growth". (NOPE, he said "it happens collaboratively")

Question 4: What are examples of the principle: "Information about you on the internet will be used by somebody in their interest — including against you"…

☐ Hackers stealing your personal information for identity theft. (YEP)

☐ Hackers stealing your private information for extortion. (YEP)

☐ Advertisers using your web browsing habits to show you online custom ads. (YEP)

☐ Data brokers selling information about you to offline advertisers. (YEP)

Question 5: What is *Stuxnet*? A computer worm used to spin Iranian uranium enrichment centrifuges out of control.

Question 6: Octal (base 8) is another base that computer professionals sometime use to represent numbers. How many different things can be represented by two octal characters, with each character 0-7? Each are independent, so it's 8*8=64

Question 7: Here are helper blocks for control and sensing of a robot, starting in the bottom center of the grid, facing up? Which letters are reached if we run the script? A,C … go straight, turn left, turn left, and cycle on A and C forever.

Question 8: If we swap the cases for testing and going LEFT with the cases for testing and going RIGHT, how does the # of letters we reach change? Remains the same (since the maze is symmetric left-right).

Question 9: What is 

? Well, 

so rotating the '**a**' around and spinning it once it gets to the front yields: **bears**.

Question 10: Imagine a series of these blocks (possibly very many) composed together. If the *output* of this composed expression were "**treat**", which of the following could have been the *input*?

beats YES! Spin the **b** into a **r**, then "spin1st of right" to bring the **s** to the front as a **t**.

reatt NOPE! Can't get the **t** at the end to the front without spinning it past itself, you'll get **ureat**.

aaaaa NOPE! Surprisingly, can't get "**at**" to be together, since you can only spin the front letter (to make it a **t**) but every time you try to get an **a** from the back to the front it becomes a **b**.

ataaa YES! The same problem in the previous problem is now solved, you just spin the three **a**s to the front to be '**tre**'.

Question 11: Wouldn't it be great if a predicate existed to tell us whether a *particular* input **word** (say one of the four above), sent through an arbitrary composed expression of these two blocks could ever produce an output **goal** word? In some sense, we think of it as asking whether we can get from **word** to **goal**. Let's write it together!