

# Final Exam

COMPUTER PROGRAMMING FOR ENGINEERING AND SCIENCE  
(CSCE 150E, SUMMER 2009)

Held on 13 August, 2009

*13 August, 2009*

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Name :  
Course No : **CSCE150E**

## Instructions:

1. There are two parts to this exam. The first part pertains to program developments of the game of Latrunculi and of the puzzle of Sudoku. The final version is functional but not perfect. You are very welcome to have copies for your entertainment and further practice in programming! The second part is in a traditional exam format.
2. All answers should go on blank paper that will be provided. Very carefully number and draw lines separating each solution!
3. This is open book, open note, open computer, but not open neighbor. There should be lab space available.
4. If you have a question about the meaning of an exercise, ask! Getting things wrong because of misunderstandings can be aggravating for me as well as you.

The first set of exercises refer to the code of the Latrunculi and Sudoku program series. Complete at least half of the questions on each iteration of the program ( $\text{ceil}(n/2)$  where  $n$  is the number of questions in each iteration). So if the section for iteration 7 has 5 questions, you should do at least 3 of them. If you do more than the minimum number, they will all be scored and you will earn the best of the minimum number of them. The files can be found at the cs150 folder on my Web site. There are a few questions that I am identifying as being extra challenging, for which some extra bonus credit will be provided if you choose to do them and do them well. They are not marked in any way.

1. (Latrunculi 1) Why is a cell array used for 'player'?
2. (Latrunculi 1) What is the effect of ' ' (two single quotes) in the input prompt?
3. (Latrunculi 1) Is there a problem with the 'anotherGame' prompt asking for y or n, but comparing the response to Y? Explain.
4. (Sudoku 1) Why isn't it "while another == true" instead of "while another"?
5. (Sudoku 1) Which of the functions are stubs? Explain.
6. (Latrunculi 2) What does each position in 'marker' represent?
7. (Latrunculi 2) What is the effect of "board = char(board)"?
8. (Sudoku 2) What happens if the response to input is 2? Why?
9. (Sudoku 2) What do we know about the array 'board' (size, type, etc.)?
10. (Latrunculi 3) Why does 'playGame' use a while loop instead of a for loop?
11. (Latrunculi 3) What is the practical effect of "it = 3 - it"?
12. (Sudoku 3) Why is the input prompt split up in 'getCustomBoard'?
13. (Sudoku 3) 'mask' is logical. If it were not, would "board(mask) = ' '" work? Explain.
14. (Latrunculi 4) There are two inputs in 'getPlay'. Why?
15. (Sudoku 4) Rewrite 'playGame' to allow the user to enter words in response to the menu.
16. (Latrunculi 5) What is the difference between 'validPlay' and 'validMove'?
17. (Latrunculi 5) 'validMove' is more than just 'validFormat'. Explain.
18. (Sudoku 5) What is the effect of '%c'?
19. (Sudoku 5) Rewrite 'showBoard' to use at least one loop.
20. (Latrunculi 6) What does it mean to have a 'validGap'?
21. (Latrunculi 6) What is the effect of subtracting '@' and '0' from 'ca' and 'ra'?
22. (Latrunculi 6) What is the relevance of having 'max' and 'min' in the computation of 'validGap'?

23. (Sudoku 6) Exactly when is 'done' true in 'solved'?
24. (Latrunculi 7) What would be a really practical reason for using letters to designate columns?
25. (Sudoku 7) What is the difference between 'sort(board, 1)' and 'sort(board, 2)'?
26. (Sudoku 7) Why would 'sum(sum(c)) == 81' indicate 'done' is true?
27. (Sudoku 7) In 'allQuadsDone', is the "done = true" really needed? Explain.
28. (Latrunculi 8) What is the purpose of 'tmp' in 'makePlay'?
29. (Sudoku 8) In 'makeGuess', is there any check to ensure the entry square is open?
30. (Sudoku 8) Why is 'board' immediately updated before doing 'validBoard'? Hint: What will 'validBoard' check for?
31. (Latrunculi 9) What is the preactical effect of "tranCol = abs(2 \* destCol - 13)"?
32. (Latrunculi 9) Distinguish among 'row', 'rowCnt', 'rowNum', and 'rowPos'.
33. (Sudoku 9) In 'validBoard', what is actually assigned into 'quad'?
34. (Sudoku 9) What is a valid row, column, or quad?
35. (Latrunculi 10) Why is there all the attention to 'upper' and 'lower' in 'checkCorner'?
36. (Sudoku 10) What does the data being sent to 'valid9' consist of?
37. (Latrunculi 11) How does 'zap' ensure that only lower case letters are removed?
38. (Latrunculi 11) What is happening in the 'if' statements of 'checkSeq'? Hint: Look up help on 'any'.
39. (Sudoku 11) How does 'valid9' work? Explain, preferably with an example.
40. (Latrunculi 12) How does 'updateScore' calculate the scores?
41. (Sudoku 12) What is the intent of the nested loop in 'getHint'?
42. (Sudoku 12) Why is 'hint' initially set to false?
43. (Latrunculi 13) What does 'find' do (in function 'checkBlock')? Hint: Look it up!
44. (Latrunculi 13) What is it we are finding? Why?
45. (Sudoku 13) What is the significance of checking 'length' to be 8?
46. (Sudoku 13) Using the default board, give an example of what an instance of r, c, and q would look like.
47. (Sudoku 13) What would make what looks like a good hint actually result in an inconsistency?
48. (Latrunculi 14) What is 'declareWin' doing to determine the winner?

49. (Sudoku 14) What is meant by “more complicated multiway complete 9”?
50. (Sudoku 14) What is really meant by ‘s’, ‘df’, ‘spread’, ‘bigGap’, and ‘tBigGap’?

This part of the exam may closely resemble the midterm and quizzes. If you have your old midterm and have studied from it, you may certainly use it and have no problem with this part of the exam. But note - there may be slight changes, so read carefully!