

BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI
DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION SYSTEMS
Artificial Intelligence (BITS F444/ CS F407)
I Semester 2019-20
Programming Assignment-3
Coding Details
(October 17, 2019)

Instruction: Type the details precisely and neatly

a. ID 2017A7PS0171P_____

Name _PRATEEK SHARMA_____

2. Mention the names of Submitted files :

a. <finalpruning.py>

b. <coding details PA3_prateek.pdf>0

3. Total number of submitted files:ANS: 1

4. Name of the folder :2017A7PS0171P

5. Have you checked that all the files you are submitting have your name in the top?ANS:YES

6. Have you checked that all the files you are submitting are in the folder as specified in 4 (and no subfolder exists)?ANS:YES

7. Problem formulation

a. State representation: A 2d list of 16 elements all elements are 0 initially , will take 1 for CPU turn and 2 for user turn

b. Pseudo code of your successor function: child(lst,action) return childnode{
child=deep copy of list

X=-1

For l in range 4: // actions are 0,1,2,3 for 1,2,3,4 column respectively

{

If child[i][action] is zero

X=l

Break the loop}

If X is -1

{ return none

}

If number of 1 is more than number of 2 in child list

Child[i][action]=2

Else

Child[i][action]=1

Return child

}

c. Terminal states generation process:

ANS: Create all children until all elements of a child get filled or goal state reaches.

d. Data structure to store terminal states: ANS: list in stack

e. Method to access terminal states and corresponding utility values: ANS: value from heuristic function if terminal state as described in "c" part of this section is achieved.

8. Minimax Technique details

a. Node structure: 2d list of size 4*4

b. Method to ensure the correctness of terminal test (describe in maximum 4 lines): ANS: if goal has achieved i.e 3 coin in a row for any player in any direction or all positions of node are full.

c. Total number of nodes generated to play one game: ANS: 46809

d. Write the statistics here as asked

R1 = 52790

R2 = 96 bytes

R3 = 16

R4 = 15.03

R5 = 3.5

e. Code status (implemented fully/ partially/ not done): implemented fully

9. Alpha Beta technique details:

a. Explain the logic used for pruning (in maximum four lines): ANS: for a node on its first branch (first child) get the and value store it, in second branch whatever first value you get for the second branch if it is worst than previous one then prune second branch.

b. Total number of nodes generated to play one game: 2730

c. Write the statistics here as asked

R6 = 2990

R7 = 0.94

R8 = 8.26

d. Code status (implemented fully/ partially/ not done):fully implemented

10. Comparative analysis

R9 = 50300kb more for minmax

R10 = 15.03 for minmax >8.26 for pruning

R11= 5 minmax 6 pruning

R12= 5.5 minmax 6.1 pruning

Fill in the following information based of 10 independent games

	Minimax Algorithm	Alpha Beta Pruning
Average number of nodes created	52790	2990
Average time taken	15.03	8.26
Number of times machine wins (player M)	5	6

11. GUI details

- Created the GUI (yes/ No):ANS:yes
- Have created it according to the specifications?(yes/No):ANS :yes
- Which module of Python is used for creating graphics? ANS: Tkinter
- Is this under the standard Python library or not?:ANS :yes
- If not, why?

12. Graphics details:

- Is graphics working fine for displaying the board and coins?ANS:yes
- How have you calibrated the board and accepted human input to play the game?ANS:yes
- How are you showing the base line?ANS:the topmost line of grid
- How are you showing the move of the machine?ANS:by placing green colour coin
- How are you showing the move of the human player?ANS:by placing red colour coin

13. Compilation Details:

- Code Compiles (Yes/ No):_____yes_____
- Mention the .py files that do not compile:_____none_____
- Any specific function that does not compile:_____NONE_____
- Ensured the compatibility of your code with the specified Python version(yes/no)_____yes_____
- Instructions for compilation of your files mentioning the multi file compilation process used by you (We may use the replica of these for compiling your files while evaluating your code)::single file compile that file

14. Driver Details: Does it take care of the options specified earlier(yes/no):ANS:yes

15. Execution status (describe in maximum 2 lines) ANS:run the file FINALPRUNING.py in editor

16. Declaration: I, ___prateek sharma_____ (name) declare that I have put my genuine efforts in creating the python code for the given programming assignment and have submitted only the code developed by me. I have not copied any piece of code from any source. If the code is found plagiarized in any form or degree, I understand that a disciplinary action as per the institute rules will be taken against me and I will accept the penalty as decided by the department of Computer Science and Information Systems, BITS, Pilani.
ID_2017A7PS0171P_____ Name:___PRATEEK SHARMA___

Date: 17 OCT 2018

Should not exceed three pages