**BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI**

Batch No. :

**DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION SYSTEMS**

**Artificial Intelligence (BITS F444/ CS F407)**

**I Semester 2018-19**

**Programming Assignment-3**

**Coding Details**

**(October 20, 2018)**

*Instruction: Type the details precisely and neatly*

1. ID \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_2015A7PS0032P\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Suyash Patel\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Mention the names of Submitted files :
   1. draw.py
   2. <filename.ext>
   3. <filename.ext>
   4. <filename.ext>
   5. <filename.ext>
   6. <filename.ext>
   7. <filename.ext>
2. Total number of submitted files: \_\_\_\_\_\_\_\_1\_\_\_
3. Name of the folder :\_\_\_\_\_\_\_\_\_\_\_\_\_2015A7PS0032P\_\_\_\_\_\_\_\_\_\_\_\_
4. Have you checked that all the files you are submitting have your name in the top?(yes/no) Yes
5. Have you checked that all the files you are submitting are in the folder as specified in 4 (and no subfolder exists)?(yes/no) Yes
6. Problem formulation
   1. State representation:

A list of variable sized lists where 0 indicates vacant circle, 1 represents circle occupied by player 1's coin and 2 represents circle occupied by player 2's coins.

* 1. Pseudo code of your successor function

Traverse the list mentioned above,

if(turn == 1) make all moves, check if in hash table and put in visited set

else if(turn == 2) make all moves, check if in hash table and put in visited set

else skip

* 1. Terminal states generation process (manual/ automated) . Also describe if it is one time generation of terminal states or you are generating the terminal states every time you reach next state.

Automated. Terminal states are generated only once and put in the hash table

* 1. Data structure to store terminal states (hash table or any other?)

Hash Table to store terminal state and corresponding utility values.

* 1. Method to access terminal states and corresponding utility values

Check whether the present state exists in the hash table or not and retrieve its utility value.

1. Minimax Technique details
   1. Node structure:

* 1. Method to ensure the correctness of terminal test (describe in maximum 4 lines)
  2. Are you limiting the depth using any heuristic to evaluate the approximate value of the state? At which depth are you deciding to return back?

Yes, because a simple minimax algorithm takes unreasonably long to give results.

* 1. Total number of nodes generated to play one game:
  2. Write the statistics here as asked

R1 = R2 = R3 =

R4 = R5=

* 1. Code status (implemented fully/ partially/ not done) Not done

1. Alpha Beta technique details:
   1. Explain the logic used for pruning (in maximum four lines)
   2. Total number of nodes generated to play one game
   3. Write the statistics here as asked

R6 = R7 = R8 =

1. Code status (implemented fully/ partially/ not done)

1. Comparative analysis

Fill in the following information based of 10 independent games

|  |  |  |
| --- | --- | --- |
|  | Minimax Algorithm | Alpha Beta Pruning |
| Average number of nodes created |  |  |
| Average time taken |  |  |
| Number of times machine wins (player M) |  |  |

1. GUI details
   1. Created the GUI (yes/ No): yes
   2. Have created it according to the specifications?(yes/No) : No
   3. Which module of Python is used for creating graphics? Turtle
   4. Is this under the standard Python library or not? Yes
   5. If not, why?
2. Graphics details:
   1. Is turtle graphics working fine for displaying the board and coins?

Yes

* 1. How have you calibrated the board and accepted human input to play the game?

No

* 1. How are you showing the board?

It is an image

* 1. How are you showing the move of the machine?
  2. How are you showing the move of the human player?

1. Compilation Details:
   1. Code Compiles (Yes/ No):\_\_\_\_\_\_\_\_Yes\_\_\_\_\_\_
   2. Mention the .py files that do not compile:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. Any specific function that does not compile:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   4. Ensured the compatibility of your code with the specified Python version(yes/no)\_\_\_\_\_Yes\_\_\_\_\_\_\_
   5. 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)
2. Driver Details: Does it take care of the options specified earlier(yes/no):\_\_\_\_\_\_\_\_\_\_\_
3. Execution status (describe in maximum 2 lines)

draw.py creates the GUI.

1. Declaration: I, \_\_\_\_\_\_\_\_\_\_\_Suyash Patel\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (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\_\_\_\_\_\_\_\_\_\_\_\_\_2015A7PS0032P\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Suyash\_\_\_\_\_\_\_\_\_\_

Date: \_\_\_\_\_\_\_\_\_\_20/10/2018\_\_\_\_

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