**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-1**

**Coding Details**

**(September 10, 2018)**

*Instruction: Type the details precisely and neatly*

1. ID \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_2016A7PS0025P\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_Santhati kali vara Purushotham\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Mention the names of Submitted files :
   1. <filename.ext> 2016A7PS0025P.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 :\_\_\_\_\_\_\_2016A7PS0025P[.zip\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Have you checked that all the files you are submitting have your name and ID (in comments) 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

1. Problem formulation
   1. State representation:

Array of 1’s and 0’s

* 1. How is the Initial state generated?

With the help of percentageOfSquares, initialstategenerator function calculates the squares and generates

* 1. What is the goal state?

The states which statisfies the behavior mentioned in question

* 1. Are there more than one goal states?

yes

* 1. How have you created the goal states for 1, 2 and 3 squares in the goal states? (manually/ automated)

automated

* 1. Mention the numbers of goal states possible for 1, 2 and 3 squares separately.
     + For 1 square in the goal state: \_\_\_\_\_\_\_\_30\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
     + For 2 squares in the goal state: \_\_\_\_\_\_\_\_\_162\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
     + For 3 squares in the goal state: \_\_\_\_\_\_\_\_\_\_648\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* 1. State representation in Python (name the construct and give one small example of a state)

class state:

def \_\_init\_\_(self,arr,start):

self.arr = arr

self.start = start

[1,1,1,1,1,1,1,1,1,1, 1,1,1,1,1,1,1,1,1,1, 1,1,1,1,1,1,1,1,1,1, 1,1,1,1,1,1,1,1,1,1]

1. coveragePercentage: In function initialStateGenerator (gridSize n, coveragePercentage p), what is your interpretation and usage of p? Does p refer to the percentage coverage area of the complete grid or percentage of maximum n2 squares? \_\_\_\_\_\_\_\_\_percentage of maximum nxn squares\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Goal test: Describe the logic used in implementing goal test. Also describe any additional data structures used to store the goal states.

Goal states are stored in GoalStates list first 30 consists of 1 square next 162 2 squares next 648 3 squares Therefore it checks only a part of list according to the number of squares

1. Time for goal test: Mention the time complexity of goal test implemented by you. \_\_\_\_\_\_O(1)\_\_\_\_\_\_\_\_\_\_\_
2. Are you creating the goal states automatically every time you are applying the goal test? (yes/No) Why? \_\_\_\_\_\_\_\_No It will generated at the start of propgram It is timewaste to generated the goal states each time\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Define your understanding of a move in the given problem:\_\_adds invisible matchstick\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. What is the branching factor (maximum)?\_\_\_\_\_\_\_\_\_\_\_40\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Successor function description

There are two successor functions addchild\_DFS and addchild\_BFS for DFS and BFS

1. Uninformed Search Technique (T1) details
   1. Technique used for search:

DFS

* 1. Reason for selecting this technique over the other two:

Memory storage less

* 1. Is the search applied on match sticks, squares or on states? states
  2. Error handling and reporting (yes/No): no
  3. List the errors handled:
  4. Data Structure description for the tree node (in maximum two lines):

Refers to state

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

1. Uninformed search Technique (T2) details:
   1. Technique used for search: BFS
   2. Reason for selecting this technique over others: takes less time
   3. Does this technique look at a square or a match stick? Match stick
   4. Does this technique use a state? yes
   5. Code status (implemented fully/ partially/ not done) fully
2. GUI details
   1. Created the GUI (yes/ N0): yes
   2. Have created it according to the specifications?(yes/No) no
   3. Which module of Python is used for creating graphics? Tkinter, turtle
   4. Is this under the standard Python library or not? yes
   5. If not, why?
   6. Are the window panes working independently? no
3. Graphics details:
   1. Is turtle graphics working fine for removal of the match stick? yes
   2. How are you creating the environment of the intelligent agent?
   3. How are you showing the matchsticks?
   4. Are you showing the removal of a match stick graphically as per the action path produced by T1 ? Describe the turtle actions appropriately.

Forward\_horizontal,Forward\_vertical,jump

* 1. Are you showing the removal of a match stick graphically as per the action path produced by T2 ? Describe the turtle actions appropriately. yes

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):\_\_yes\_\_\_\_\_\_\_\_\_
3. Execution status (describe in maximum 2 lines)

It executes as per the requirement except it won’t displays the text on leftmost column

Rather displays on command prompt displays memory utilized per node at the start of search,no of nodes transverse and memory in total if it reached goal state and outp[uts time taken irrespective of output after search.

1. Output Details
   1. Copy and paste the output of three graphs G1-G3 here

G1

G2

G3

Write some more details here for the above graphs, if needed

* 1. Write the following values computed by you (refer the details of R1-R11 in the assignment document). Use appropriate units for the values

R1: R2: R3: R4:

R5: R6: R7: R8:

R9: R10: R11: R12:

1. Declaration: I, \_\_\_\_\_\_\_\_\_\_\_\_\_Santhati kali vara purushotham\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (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\_\_\_\_\_\_\_2016A7PS0025P\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Name:\_\_\_\_ Santhati kali vara purushotham \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date: \_10-09-2018\_\_\_\_\_\_\_\_\_\_\_\_\_

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Should not exceed 5 pages