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

Batch No. :

**DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION SYSTEMS**

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

**I Semester 2019-20**

**Programming Assignment-4**

**Coding Details**

**(November 1, 2019)**

*Instruction: Type the details precisely and neatly*

1. ID \_\_\_\_2017A7PS0068P\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Name \_\_\_\_\_\_\_\_J LAKSHMI TEJA\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Mention the names of Submitted files :
   1. <ac3.py>
   2. <dfs\_bt.py>
   3. <driver.py>
   4. <gui.py>
   5. <gen.py>
2. Total number of submitted files: \_\_\_\_5\_\_\_\_\_\_\_
3. Name of the folder :\_\_\_\_\_\_\_\_2017A7PS0068.zip\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Have you checked that all the files you are submitting have your name in the top?(yes/no)

Yes

1. 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. List of variables (Specify all variables):

N1, N2, N3…….. N20

* 1. Value domains of variables (Also list the variables against each value domain correspondingly)

Domain of Ni is the time slots at which Ni is free for all 1<=i<=20

* 1. Mention the constraints

No 2 variables present in the same group can be assigned the same time slots

1. Data structure used
   1. Constraint graph node structure:

A dictionary of assignments.

Keys are the variable number( 0-indexed).

For example, the key for N8 is 7.

* 1. Constraint graph edge structure:

A list of variables for each variable that it is constrained with.

* 1. Constraint graph (Adjacency list/ adjacency matrix/ any other(specify)

Adjacency list

* 1. How are you maintaining value domains as you go with search process?

A list of lists called domain\_value.

domain\_value[i] is the domain list for N(i+1).

1. DFS + backtracking technique details
   1. Variable ordering used (List heuristics used):

MRV and degree hueristics

* 1. Node structure for DFS:

A dictionary of assignments.

Keys are the variable number( 0-indexed).

For example, the key for N8 is 7.

* 1. Method for assignment of a value to a variable and backtracking:

Updating the dictionary

* 1. How is edge node of your adjacency list (constraint graph) useful in deciding upon which constraint module( or modules) to use for testing the violation of the constraints while you assign a value to a variable?

Helps ensure that an assignment can be checked for all constraints that can be potentially violated.

* 1. Total number of nodes generated for assignment of values to all variables: 8546
  2. Write the statistics here as asked

R1 = 8546 R2 = 1184 R3 =

R4 = 0.6344 s R5= 326

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

1. DFS+ Backtracking using constraint propagation:
   1. Explain the method for constraint propagation. How are you updating the value domains? What do you do with the value domains of the variables when you backtrack while performing DFS?

AC-3 is used for propogation

Domain values maintained by updating the dictionary

* 1. Total number of nodes generated using the above technique
  2. Write the statistics here as asked

R6 = 371 R7 = 0.956 R8 = 0.023 s

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

1. Comparative analysis

Fill in the following information

|  |  |  |
| --- | --- | --- |
|  | DFS+BT | DFS+BT+Constraint propagation |
| Average number of nodes created | 8000 | 300 |
| Average time taken | 0.5 | 0.025 |

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)

Use:

python3 driver.py

1. Driver Details: Does it take care of the options specified earlier(yes/no):\_\_\_\_\_Yes\_\_\_\_\_\_
2. Execution status (describe in maximum 2 lines)

Executes successfully

1. Declaration: I, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_J LAKSHMI TEJA\_\_\_\_\_\_\_\_ (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\_\_\_\_\_\_\_\_\_\_\_2017A7PS0068P\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Name:\_\_\_\_\_J LAKSHMI TEJA\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date: \_\_\_\_1/11/2019\_\_\_\_\_\_\_\_\_\_

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