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

Batch No. :

**DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION SYSTEMS**

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

**I Semester 2017-18**

**Programming Assignment-4**

**Coding Details**

**(November 14, 2017)**

*Instruction: Type the details precisely and neatly*

1. ID 2015A1PS0524P

Name ANUP BHUTADA

Mention the names of Submitted files :

* 1. <anup\_start.py>
  2. <logic.py>
  3. <agents.py>
  4. <utils.py>
  5. <2015A1PS0524P.docx>
  6. <predicates1.txt>
  7. <predicates3.txt>
  8. <pred\_meaning1.txt>
  9. <pred\_meaning3.txt>

1. Total number of submitted files: 9
2. Name of the folder : anup\_2015A1PS0524P
3. Have you checked that all the files you are submitting have your name in the top?(yes)
4. Have you checked that all the files you are submitting are in the folder as specified in 4 (and no subfolder exists)?(yes)
5. Techniques implemented
   1. Forward Chaining (Yes)
   2. Backward Chaining (Yes)
   3. Resolution (No)
6. Logic Problems solved manually
   1. Logic Problem 1 (Yes/No) : YES
   2. Logic Problem 2 (Yes/No) : NO
   3. Logic Problem 3 (Yes/No) : YES
   4. Logic Problem 4 (Yes/No) : YES
7. Data structures used
   1. For defining predicate: Expr class defines in logic.py
   2. Rules: Expr class defines in logic.py
   3. Knowledge base: class KBase defined in anup\_start.py
   4. Rules in CNF form:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   5. Knowledge base in CNF form : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
8. Implementation Details for Forward Chaining technique
   1. Did you modify the technique given in logic.py? No
   2. Name the module(s) that you implemented fresh to implement the technique: KBase class, forward chaining function, listliterals function
   3. Which data structure(s) did you use to implement forward chaining for FOL? Explain.

Dictionary for unification and and KBase for representing knowledge base

* 1. What is the time complexity of the technique? O(n^3)
  2. What is the space complexity of the technique? O(n)

1. Implementation Details for Backward Chaining technique
   1. Did you modify the technique given in logic.py? NO
   2. Name the module(s) that you implemented fresh to implement the technique: backwardChaining function, listliterals function, KBase class
   3. Which data structure(s) did you use to implement backward chaining for FOL? Explain.

KBase, dictionary for unification

* 1. What is the time complexity of the technique? O(n^3)
  2. What is the space complexity of the technique? O(n)

1. Implementation Details for resolution technique
   1. How did you handle the complimentary literals and resolvent clauses in your implementation?

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* 1. Did you modify the technique given in logic.py? If yes, give details.
  2. Name the module(s) that you implemented fresh to implement the technique:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  3. Which data structure(s) did you use to implement resolution technique for FOL? Explain.
  4. What is the time complexity of the technique?
  5. What is the space complexity of the technique?

1. Files
   1. Submitted the files consisting of predicates description (yes)
   2. Submitted the files consisting of the rules in FOL (yes):\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. Generated files after converting rules in CNF form (no):\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   4. Generated output files as desired (no):\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   5. Submitted all four files (a-d) for logic problems 1-4 (No):\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   6. If not, which logic problem(s) not handled (2,4)
2. Graphics: Created the graphics (no)
3. Compilation Details:
   1. Code Compiles (Yes):\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. Mention the .py files that do not compile:NA\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. Any specific function that does not compile:NA\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   4. Ensured the compatibility of your code with the specified Python version(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) running the anup\_start.py file will load up all the other files.
4. Driver Details: Does it take care of the options specified earlier(no)\_
5. Execution status (describe in maximum 2 lines) –The program executes and compiles without any errors
6. Declaration: I, ANUP BHUTADA 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 2015A1PS0524P Name: ANUP BHUTADA

Date: 14TH November 2017

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