

## Assignment 2

(COMP 3608 - Intelligent Systems)  
(For students who want to obtain 4 credits)

**Date Available:** Thursday, March 07, 2019

**Due Date:** 11.50 PM, Sunday, March 24, 2019

**Total Mark:** 100 marks (weighted 7% out of 100%)

**Question 1:** [40] Suppose the database initially includes facts  $A$ ,  $B$ ,  $C$ ,  $D$  and  $E$ , and the knowledge base contains only three rules:

Rule 1: IF ( $Y$  is true) AND ( $D$  is true) THEN  $Z$  is true

Rule 2: IF ( $X$  is true) AND ( $B$  is true) AND ( $E$  is true) THEN  $Y$  is true

Rule 3: IF ( $A$  is true) THEN  $X$  is true

a. Write a CLIPS program named `Fig5.clp` to implement the three rules given above.

b. Run the program `Fig5.clp`, observe its outputs, and explain how the inference process was performed on the above set of three rules and five facts by CLIPS to infer the fact  $Z$ .

*Hint:* Use the command `(agenda)` to show the list of activated rules (i.e., activations).

c. Write a Prolog program named `Fig5.pl` to implement the three rules and five facts given above.

d. Trace the execution of the program `Fig5.pl`, observe its outputs, and explain how the inference process was performed on the above set of three rules and five facts by Prolog to infer the fact  $Z$ .

*Hint:* Use the `trace.` command to show the execution steps performed by Prolog.

**Question 2:** [40 marks] Suppose that a database initially includes the facts  $A$ ,  $B$ ,  $C$ ,  $D$  and  $E$ , and the knowledge base contains a set of five rules as follows.

Rule 1:	Rule 2:	Rule 3:	Rule 4:	Rule 5:
$Y \& D \rightarrow Z$	$X \& B \& E \rightarrow Y$	$A \rightarrow X$	$C \rightarrow L$	$L \& M \rightarrow N$

a. Write a CLIPS program named `Fig6.clp` to implement the five rules given above.

b. Run the program `Fig6.clp`, observe its outputs, and explain how the inference process was performed on the above set of five rules and five facts by CLIPS to infer the fact  $Z$ .

*Hint:* Use the command `(agenda)` to show the list of activated rules (i.e., activations).

c. Write a Prolog program named `Fig7.pl` to implement the five rules and five facts given above.

d. Trace the execution of the program `Fig7.pl`, observe its outputs, and explain how the inference process was performed on the above set of five rules and five facts by Prolog to infer the fact  $Z$ .

*Hint:* Use the `trace.` command to show the execution steps performed by Prolog.

**Question 3:** [20 marks] Implement the demonstrative expert system named Media Advisor in Negnevitsky's book (Section 2.7, page 41-57) using

a. [10 marks] CLIPS (name your program `MediaAdvisor.clp`) and

b. [10 marks] Prolog (name your program `MediaAdvisor.pl`).

### Assignment Requirements and Marking Scheme

1. For the CLIPS programs, you need to capture and show the outputs of their executions.
2. For the Prolog programs, you need to capture and show the outputs of their executions. In addition, use the `trace.` command to show the steps executed by Prolog.

### Submission

1. At the top of your files, you should include the following information.

```
/*
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Full Name:
```

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Student ID:
```

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Email:
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Course Code:
```

```
*/
```

2. Submit your files zipped into the file named **A2\_StudentID.zip** (e.g., **A2\_809000437.zip**) to Mr. Inzamam via the email [inzamam.rahaman@outlook.com](mailto:inzamam.rahaman@outlook.com).
3. Late submission penalty: 10% per day, up to five days

**End of Assignment 2**