Assignment 10

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-11-25, 23:59 IST.

1) Which of the following statement(s) are true about Production Systems?

- The knowledge in a Production System is represented as a set of rules, a database of facts, and a control strategy
- They act as a backward chaining rule based system
- The rules in Production Systems are of the form: condition-action, antecedent-consequent, pattern-action, situation-response pairs
- The rules in Production Systems are learnt by patterns of WMEs appearing together in large databases

No, the answer is incorrect.
Score: 0
Accepted Answers:
The knowledge in a Production System is represented as a set of rules, a database of facts, and a control strategy
The rules in Production Systems are of the form: condition-action, antecedent-consequent, pattern-action, situation-response pairs

2) Which of the following terms are synonymous with “working memory” in a production system?

- Current state of the system
- Domain knowledge encoded in the system
- Short term memory of an expert system
- Long term memory of an expert system
- WMEs residing in the alpha nodes in a rete network

No, the answer is incorrect.
Score: 0
Accepted Answers:
Current state of the system
Short term memory of an expert system
WMEs residing in the alpha nodes in a rete network

3) Which of the following terms are synonymous with “rules” in a production system?

- Current state of the system
- Domain knowledge encoded in the system
- Short term memory of an expert system
- Long term memory of an expert system
- WMEs settled at the alpha nodes in a rete network

No, the answer is incorrect.
Score: 0
Accepted Answers:
Domain knowledge encoded in the system
Long term memory of an expert system

4) Which of the following terms are synonymous with “Inference Engine” in a production system?

- Exactly one cycle of Match-Resolve-Execute
- An endless cycle of Match-Resolve-Execute
- A continuous learner of rules from the WMEs present in large databases in production systems.
- A forward chaining rule based mechanism

No, the answer is incorrect.
Score: 0
Accepted Answers:
An endless cycle of Match-Resolve-Execute
A forward chaining rule based mechanism

5) Can you recall “conflict sets” from the lectures? What is the conflict about?

- Exactly one cycle of Match-Resolve-Execute
- An endless cycle of Match-Resolve-Execute
- A continuous learner of rules from the WMEs present in large databases in production systems.
- A forward chaining rule based mechanism

No, the answer is incorrect.
Score: 0
Accepted Answers:
An endless cycle of Match-Resolve-Execute
A forward chaining rule based mechanism
These are the distinct sets of WMEs matching the same rule. The conflict is about selecting one of the sets of WMEs matching the given rule to fire next. It is a set of WMEs matching different rules. The conflict is about selecting one of the rules matching with the given set of WMEs to fire next. It is a set of matching Rule-WMEs tuples. The conflict is about selecting the next rule instance to be executed. It is a set of all Rule-WMEs pairs. The conflict is about selecting the right WMEs to match each rule.

No, the answer is incorrect. Score: 0

Accepted Answers:
- It is a set of matching Rule-WMEs tuples. The conflict is about selecting the next rule instance to be executed

6) In the Rete algorithm when all the WMEs that match a rule remain as is in the working memory after the rule is executed; does that create a problem?

- Yes. The WMEs would keep matching the same rule and the IE will go in an infinite loop of executing the same rule
- Yes. The matching WMEs should be removed from the WM explicitly to prevent them from matching the same rule again.
- Yes. The rule should be temporarily added to a taboo list to prevent it from matching the same WMEs again.
- No. The property of refractoriness ensures that each rule is executed only once with a set of WMEs.
- No. The rule once executed is removed from the conflict set in order to prevent it from firing again.

No, the answer is incorrect. Score: 0

Accepted Answers:
- No. The property of refractoriness ensures that each rule is executed only once with a set of WMEs.
- No. The rule once executed is removed from the conflict set in order to prevent it from firing again.

7) The motivation behind employing the Rete algorithm is ______________.

- to reduce the space complexity of long term memory.
- to achieve intercycle savings during Match-Resolve-Execute.
- to achieve intracycle savings during Match-Resolve-Execute.
- To achieve faster execution of a selected rule instance.
- to improve upon the process of matching WMEs with the rules.

No, the answer is incorrect. Score: 0

Accepted Answers:
- to achieve intercycle savings during Match-Resolve-Execute.
- to achieve intracycle savings during Match-Resolve-Execute.
- to improve upon the process of matching WMEs with the rules.

8) Conflict resolution offers a mechanism for the programmer/user to control the execution behavior of the program as

- it can be configured to instantiate rules matching the most recently added WMEs.
- it can be configured to facilitate a rule-WMEs tuple to be executed exactly once.
- it can be configured to eliminate the inconsistencies from a set of rules.
- it can be configured to prefer the most specific matching rule.

No, the answer is incorrect. Score: 0

Accepted Answers:
- it can be configured to instantiate rules matching the most recently added WMEs.
- it can be configured to facilitate a rule-WMEs tuple to be executed exactly once.
- it can be configured to prefer the most specific matching rule.

BEGIN GROUP

Consider the following (and the only) rule in an OPS5 like language

```lisp
(p admit-some
  (member ^name <n> ^gender <m> )
  -->
  (MAKE (admitted ^name <n>))
)
```

Consider the following (and the only) WMEs ordered by increasing timestamps.

101. (member ^name Cathy ^gender f ^age 30)
102. (member ^name Alice ^gender f ^city Chennai)
103. (member ^name Bob ^gender m ^role CEO)
104. (member ^name Jill ^gender f ^hasFriend Bob)

Now, answer the following questions:

9) How many classes are referred-to in the rule given above?
10) Which of the following Rule-WME tuples will be present in the conflict set?

- admit-some, 101
- admit-some, 102
- admit-some, 103
- admit-some, 104
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
(admit-some, 101
admit-some, 102
admit-some, 103
admit-some, 104

11) If the Inference Engine is using Recency as the conflict resolution strategy, which of the following rule-WME pairs will be selected for execution first?

- admit-some, 101
- admit-some, 102
- admit-some, 103
- admit-some, 104
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
admit-some, 104

12) How many WMEs will be present in the WM after 2 cycles of execution?

Your answer should be a whole number

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 6

END GROUP

BEGIN GROUP

A Rete Net of a rule based system to identify geometrical shapes is shown in the figure.

The labels (gray boxes) uniquely identify nodes in this network. Labels starting with “A” refer to Alpha nodes and the labels starting with “R” refer to rules. The rest of the nodes are Beta nodes
The following Working Memory Elements (WMEs) are inserted into the Rete Net in the given order, and the elements are uniquely identified by their time stamps (sequence numbers in this case). Assume that the WMEs reside in the appropriate Alpha nodes, and Beta nodes point to WMEs in the Alpha nodes.

201. (color of A is RED)
202. (price of A is 10)
203. (sides in A count 3)
204. (equal-sides in A are 2)
205. (right-angles in A count 1)
206. (sides in B count 4)
207. (equal-sides in B are 4)
208. (right-angles in B count 4)
209. (parallel-sides in B pairs 2)
210. (sides in C count 3)
211. (equal-sides in C are 3)
212. (sides in D count 4)
213. (right-angles in D count 2)
214. (parallel-sides in D pairs 1)
215. (sides in E count 5)
216. (equal-sides in E are 4)
217. (right-angles in E count 3)
218. (sides in F count 6)
219. (equal-sides in F are 6)
220. (parallel-sides in F pairs 3)

Based on the given data, do the following:

a. For each working memory element identify its location (node label) in the Rete Net

b. Write the conflict set.

Now, answer the following questions.

13) The location of WME 203 is ___

Enter the label of alpha node in the text box.

No, the answer is incorrect.
Score: 0
Accepted Answers:
14) The location of WME 205 is ___

Enter the label of alpha node in the text box.

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: String) A11

15) The location of WME 220 is ____

Enter the label of alpha node in the text box.

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: String) A12

16) The number of instances of R1 in the conflict set is _____

Enter the count in the textbox. Enter 0 if a rule has no instances in the conflict set.

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 1

17) The number of instances of R3 in the conflict set is _____

Enter the count in the textbox. Enter 0 if a rule has no instances in the conflict set.

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 1

18) The number of instances of R10 in the conflict set is _____

Enter the count in the textbox. Enter 0 if a rule has no instances in the conflict set.

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Numeric) 1

19) If the Inference Engine uses Specificity as the conflict resolution strategy then identify the rule-data tuples that will be ready to fire. If multiple rule-data tuples qualify then choose the rule Ri with the smallest index i.

Your answer must be a comma separated list starting with a rule label followed by the timestamps of matching WMEs in increasing order. For instance:
R1,210,211

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: String) R10,203,204,205
(Type: String) R10, 203, 204, 205

20) If the Inference Engine uses Recency as the conflict resolution strategy then identify the rule-data tuples that will be ready to fire. If multiple rule-data tuples qualify then choose the rule Ri with the smallest index i.

Your answer must be a comma separated list starting with a rule label followed by the timestamps of matching WMEs in increasing order. For instance:
R1,210,211

...
21) For the given Working Memory, list the rules (rule labels) that are not in the conflict set. Your answer must be a comma separated list of rule labels in ascending order. If the list is empty enter NIL.

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: String) NIL

END GROUP