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**University Examinations 2015/2016**

THIRD YEAR, FIRST SEMESTER EXAMINATION FOR BACHELOR OF SCIENCE COMPUTER SCIENCE

**CCS 3329: PROGRAMMING PARADIGMS**

**DATE: NOVEMBER, 2015 TIME:** $2$ **HOURS**

**INSTRUCTIONS:** *Answer question* ***one COMPULSORY*** *and any other* ***two*** *questions.*

**QUESTION ONE – (30 MARKS)**

1. Describe the following terms; (10 Marks)
2. Recursion
3. Backtracking
4. Referential Transparency
5. Cut
6. Abstraction
7. Differentiate between Event Driven programming paradigm and Object Oriented Programming paradigm. (6 Marks)
8. Using the EUCLID’s ALGORITHM for the GCD (Greatest Common Divisor), describe characteristics of recursive functions. (6 Marks)
9. Write a recursive algorithm to display the power of any given positive integer number.

 (4 Marks)

1. Using relevant examples Differentiate between a PREDICATE and a CLAUSE in prolog programming language. (4 Marks)

**QUESTION TWO (20 MARKS)**

1. Differentiate between meta-knowledge and meta-reasoning. (4 Marks)
2. Differentiate between MODUS PONENS and MODUS TOLLENS in representation of procedural knowledge. (4 Marks)
3. “In the animal world, carnivores such as lions and leopards hunt and eat herbivores such as zebras and wild beast. Thus some animals are hunters and some are hunted, and generally speaking carnivores hunt herbivores. However, there are many exceptions to this rule. Elephants, which are herbivores, are rarely hunted because of their size. Nor are bears, which are not normally meat eaters and therefore basically herbivores. Bears will catch and eat other animals when opportunity arises”
4. Draw a well labeled semantic network to represent the above information.

(6 Marks)

1. Write a knowledge base in PROLOG that can be used to represent the above information. (6 Marks)

**QUESTION THREE (20 MARKS)**

1. Define the terms functional programming and programming language. (6 Marks)
2. Describe three important traits that constitute a programming language. (8 Marks)
3. Using relevant examples differentiate between the terms; Syntax and Semantics, of a given language. (6 Marks)

**QUESTION FOUR (20 MARKS)**

1. Giving an example of a language, describe a meta-circular interpreter. (3 Marks)
2. Differentiate between self-interpreters and meta-circular interpreter. (4 Marks)
3. From the expert psychologists the following information was gathered:
4. The prince is primarily looking for a beautiful girl. But to the eligible for the job of a prince’s wife, she’d also have to be intelligent
5. The price is young and very romantic. Therefore, he will fall in love with first beautiful girl he comes across, love her forever , and never ever consider any other woman as a potential wife again. Even if he can’t marry that girl.

The MI5 provides the committee with a database of women of the appropriate age. The entries are ordered according to the order the prince would have met them on his ride through the country. Written as a list of Prolog facts it looks something like this:

beautiful (Claudia).

beautiful (Sharon).

beautiful (Denise).

. . .

Intelligent (Margaret).

Intelligent (Sharon)

. . .

After some intensive thinking the Prolog sub-committee come up with the following ingenious rule:

bride (Girl) :-

beautiful (Girl),!,

intelligent (Girl).

Then a query of the form

?-bride (X). Is provided

1. Considering the second line above i.e , beautiful (Girl), !, describe the

meaning of the apostrophe(!) and it’s implication(s). (3 Marks)

1. In your own words, describe the results obtained after the above query is executed.(4 Marks)
2. Differentiate between each of the following terms; (6 Marks)
3. Typed and Untyped languages
4. Static and Dynamic typing

**QUESTION FIVE (20 MARKS**)

1. Describe the five main programming approaches considered in the programming paradigm. (10 Marks)
2. Write the following statements in symbolic form (5 Marks)
3. He is neither handsome nor happy
4. To be ugly is to unhappy
5. One is never happy if he is handsome
6. He cannot be both handsome and happy
7. If he is not ugly and happy, then he is handsome
8. An indoor pet is usually a pet that is small. A pet can be a dog or a cat. If it is small and a dog then it is called Simba. Simba has hairly fur.
9. Write a wff(well formed formula) logic program for the above scenario(5 Marks)