Cairo University
Faculty of Computers & Artificial Intelligence
Course: Semantic Web
Semester: Fall 2022

Assignment1

Students work in groups of maximum 2 for this assignment and select one of the following

- **Students have to be from the same lab or from another lab taught by the same TA.**
- **Bonus of 2 grades for group who can develop a user Interface for problem 2,3**
- **Deadline of submission is 30 November**

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Problems

1. Family knowledge base Add these facts to clips
   a. Add these facts to clips working memory
      Ahmed is the father of Mohammed
      Mona is the mother of Ali
      Ali is the father of Sara
      Hassan is the father of Ahmed
   b. Write rules that infer and add parents, grandfathers, grandmothers facts

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2. Write a program that will query the user for the color value and then print the list of all countries with flags that contains the specified color according to the table below.

Country	Flag color
Egypt	Red, white, and black
United states	Red, white, and blue
Belgium	Black, yellow, and red
Sweden	Yellow and blue
Italy	Green, white, and red
Ireland	Green, white, and orange
Greece	Blue and white

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3. Write a program that:
   a. read a data file containing a list of people names and their grades in 4 courses
   b. Calculate each person GPA (total/4)
   c. Write the new list to output file

Input file

Ahmed	10	9	13	7
Ali	12	3	10	14
Mohammed	8	10	12	10
Mona	15	8	14	9

Output file:

Mona	(15 8 14 9)	11.5
Mohammed	(8 10 12 10)	10.0
Ali	(12 3 10 14)	9.75
Ahmed	(10 9 13 7)	9.75

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4. Given a series of facts describing shapes use the following super class shape, contains id and color:

```
(defclass Shape
(is-a USER)
(role abstract)
(slot ID (type SYMBOL))
(slot color (allowed-values red blue green yellow)))
```

Define a child classes:

a. Square adds a length slot

b. Rectangle adds width and length slots

Both classes should have:

c. Message handler that calculate it's area

d. Message handler that calculate the perimeters

Test the output of the rules with the following definstances:

(definstances shapes

(s1 of Square (ID A)(color blue) (length 3))

(r1 of Rectangle (ID C) (width 2) (length 5)))

(reset)

(send [s1] calcArea)

9

(send [r1] calcArea)

10

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5. Given a series of facts describing shapes using the following deftemplates
(deftemplate square (slot id) (slot side-length))
(deftemplate rectangle (slot id) (slot width) (slot height))
(deftemplate circle (slot id) (slot radius))
write one or more rules that will compute the sum of
(a) The area of the shapes.
(b) The perimeters of the shapes.

Test the output of the rules with the following deffacts:

(deffacts test
(square (id A) (side-length 3))
(square (id B) (side-length 5))

(rectangle (id C) (width 2) (length 5))
(circle (id D) (radius 2))
(circle (id E) (radius 6)))

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6. Template Person

   a. Define a template for person, contains full name, children names
   b. Define a rule that prints the parents that have more than 3 children
   c. Define a rule that print the parent of a certain child
      The specified child name will be asserted in a fact called (child-name <name>)