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Subject: Artificial Intelligence

Unit: III

Topic: Frames

### Frame

Frames act as a data structure to represent a mental model of a stereotypical situation such as deriving a car, attending a meeting etc. These are general record like structures which consist of a collection of slots (attributes) and slot value. The slots may be of any size and type. Slots generally have names and values or sub-fields called facets. Facets may also have names and any number of values. Knowledge about an object or event is stored in memory as a unit and when a new situation is encountered, an appropriate frame is selected from memory for use in reasoning about the situation. General structure of a frame is:

```
( <Frame Name>
  ( <Slot-1> ( <facet-1> <value-1>.....<value-K1>
              ( <facet-2> <value-1>.....<value-K2>
                .
                .
                .
              )
  )
  .
  .
  .
  )
```

This shows that one frame can have many slots and each slot can have many facets and each facet can have many values.

### Examples of Frame

```
I      ( Mukesh Kumar
        (PROFESSION (Value Professor))
        (AGE (Value 44))
        (WIFE (Value Sunita))
        (CHILDREN (Value Monu, Pinky))
        (ADDRESS (STREET (Value JK Road))
              (CITY (Value Bhopal)))
```

(STATE (Value Madhya Pradesh))

(PINCODE (Value 462021)))

This frame conveys the information that Mukesh Kumar is a professor whose age is 44 and married to Sunita. He is having two children whose names are Monu and Pinky and lives at the address JK Road, Bhopal – 462021 (Madhya Pradesh). Here, Frame name is Mukesh Kumar; Slots are PROFESSION, AGE, WIFE, CHILDREN, and ADDRESS. Only slot ADDRESS has facets namely STREET, CITY, STATE, and PINCODE. Here, I have described in the reverse way. First, designed the Frame and then described the text to elaborate it.

II Design a frame of a car Alto whose color is gray, model LXI, gas-mileage and range is may be fetched from other place, weight is 150 kg and fuel capacity is 35 Litre.

( ALTO

(AKO (value car))

(COLOR (Value gray))

(MODEL (Value LXI))

(GAS-MILEAGE (Default fget))

(RANGE (Value if-needed))

(WEIGHT (Value 150 Kg))

(FUEL-CAPACITY (Value 35 Litre)))

Here, fget is a function call to fetch a default value from another frame. If-needed is a procedure name that when called computes the driving range of the car as a function of gas-mileage and fuel capacity. For example, suppose mileage of the car is 18 Km/Litre and fuel in the tank 15 Litre then the car can go up to that is Range will be  $18 \times 15 = 270$  Km.

Assignment:

Que-1 What is the utility of frames in the context of AI?

Que-2 Design a frame for a nurse Anita who works for CORONA patients, has one daughter named Rakhi and lives in Phoolbag, Kanpur (UP)