CLIPS

C LANGUAGE INTEGRATED PRODUCTION SYSTEM

Lecture# 1
Expert System lab Work

INTRODUCTION
Representation and Reasoning Knowledge

Environment in CLIPS
3 Main Component
NOTATION
- Like LISP programming Language signed by double colon "()".
  - e.g: 
    - (exit)

Case Sensitive

DATA TYPE
- There are 7 data types called as CLIPS primitive data type:
  1. Float
  2. Integer
  3. Symbol
  4. String
  5. External address
  6. Instance name
  7. Instance address.

START WITH CLIPS
- By Default interface of CLIPS is command prompt as interpreter.
Mengaktifkan Watch Option

Execution - Watch

Tujuan
Proses Masuk dan Keluar Fakta
ke/dari fact-list dapat terlihat

FACTS

To solve the problem in expert system, we must have data will became a resource of knowledge.

Data or Information in CLIPS called as set of facts.

The facts consist of relation-name and followed by slot

EXAMPLE

Relation name: person
Value: Ninon, 15, brown, black
Slot: Name, age, eye-color, dan hair-color
DEFTEMPLATE CONSTRUCTION

● Before the facts is made, CLIPS must know suitable slot for being defined to a relation name
● Mechanisme to create slot is deftemplate construction
● Deftemplate like format of the record in C or Pascal programming language.

SYNTAX

● Deftemplate syntax
  (deftemplate <relation-name> [optional-comment] <slot-definition>*)

● Syntax of description <slot-definition>
  (slot <slot-name> | (multislot <slot-name>))

example

● Deftemplate Person
  (deftemplate person
    (slot name)
    (slot age)
    (slot eye-color)
    (slot hair-color))

● Deftemplate-facts are the fact with format deftemplate
● Ordered-facts are the fact without format deftemplate
ADD, MODIFICATION, DUPLICATE AND REMOVE FACTS

- **Adding Fact**
  Facts can be added to working memory with command `assert`.

- **Syntax**
  
  ```clips
  (assert <fact>)
  ```

**Example**

```clips
(deftemplate person (slot name) (slot age) (slot eye-color) (slot hair-color)) <ENTER>

CLIPS>
(assert (person (name "shofiyyah") (age 15) (eye-color brown) (hair-color black))) <ENTER>

<fact-0>
```

**EXAMPLE**

- To appear set of fact used command `(facts)`. 

  ```clips
  (facts)
  ```

  
  ```clips
  f-0 (person (name "shofiyyah") (age 30) (eye-color brown) (hair-color black))
  ```

  For a total of 1 fact.
We can use command assert.

(assert (person (name "aisyah") (age 17) (eye-color blue) (hair-color brown))) <ENTER>

Example

Name Modification

(modify 1 (name "aisyah kadarusman"))
example

○ Result of Modification

CLIPS > modify 1 (name "old trixtrip")
<fact-2>
CLIPS > facts
[-] (person name "mistris") (eye 13) (eye-color brown) (hair-color black)
[-] (person name "trixtrip") (eye 17) (eye-color pink) (hair-color black)

For a total of 2 facts.

○ Duplication facts
Use Command (duplicate)

○ General Format:
  (duplicate <fact-index> <slot-duplicate>)

DUPLICATION FACTS

Example
  (duplicate 0 (age 12))

Fakta apa yang diduplikasi?
Berapa jumlah fakta di fact-list?
DELETION FACTS

- Deletion Facts
  Use Command (`retract`)

- General Format
  ```scheme```
  (retract <fact-index>)
  ```

Example

- Deletion Facts
  Use Command (`retract`)

- Example
  ```scheme```
  (retract 3)
  ```

Excercise

1. Buatlah template untuk fakta mahasiswa
   (slot nama, nrp, fakultas, departemen)
2.Tambahkan data 5 berdasarkan template tersebut!
3. Lakukan beberapa perintah sebagai berikut:
   a. Modifikasi fakultas dan departemen
   b. Duplikasi data dengan mengubah nama dan nrp mahasiswa ke-3
   c. Hapus dari working memori mahasiswa pertama