جامـــــعة المـــستقبـل
AL MUSTAQBAL UNIVERSITY

كلية العلـــوم

قســـم علوم الذكاء الاصطناعي

المحاضرة الثالثة

Data type& Program Structure &Read and Write Functions And Arithmetic and Logical Operations

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المادة: Prolog languages
المرحلة:الاولى
اسم الاستاذ: م.م اية محمد حسين محمد علي

Lecture Topics

1. Data Types
2. Program Structure
3. Read and Write Functions
4. Arithmetic and Logical Operations

1. Data Types

Prolog supports the following data types to define program entries:

1. Integer
Used to define numerical values such as:
1, 20, 0, -3, -50, etc.

2. Real
Used to define decimal values such as:
2.4, 3.0, -2.67, etc.

3. Char
Used to define a single character.
The character may be a lowercase letter, uppercase letter, or even a number, but it must be surrounded by single quotation marks.
Examples:
'a', 'C', '1'

4. String
Used to define a sequence of characters such as a word or sentence.
A string must be surrounded by double quotation marks.
Examples:
"computer", "134", "a"

5. Symbol
Another data type used to define a single character or a sequence of characters, but it must begin with a lowercase letter and must not be surrounded by single or double quotation marks.

2. Program Structure

A Prolog program structure consists of five segments. Not all of them must appear in every program, but the following segments must be included in each program: **predicates, clauses, and goal**.

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The five segments of a Prolog program are:

1. Domains

Defines global parameters used in the program.

Example:

```
domains
i = integer
c = char
s = string
r = real
```

2. Database

Defines the internal database generated by the program.

Example:

```
database
greater(integer)
```

3. Predicates

Defines rules and facts used in the program.

Example:

```
predicates
mark(symbol, integer)
```

4. Clauses

Defines the body of the program.

Example:

```
clauses
mark(a, 20).
```

5. Goal

Can be internal or external.
The internal goal is written after the clauses part, while the external goal is supported by the Prolog compiler if the program syntax is correct.
This part contains the rule that drives program execution.

3. Arithmetic and Logical Operations

A. Arithmetic Operations

Operation	Symbol
Addition	+
Subtraction	-
Multiplication	*
Integer division	div
Remainder of division	mod

B. Logical Operations

Operation	Symbol
Greater than	>
Less than	<
Equal	=
Not equal	<>
Greater than or equal	>=
Less than or equal	<=

4. Read and Write Functions

Read Functions

`readint(Var)`

Reads an integer value.

`readchar(Var)`

Reads a character value.

`readreal(Var)`

Reads a real (decimal) value.

`readln(Var)`

Reads a string.

Write Function

`write(Var)`

Writes or prints a variable of any type.

Example 1

Write a Prolog program to read an integer value and print it.

```
domains
    i = integer

predicates
    print

clauses
    print :-
        write("please read integer number"),
        readint(X),
        write("you read", X).
```

```
goal
    print.
```

Output:

```
Please read integer number 4
You read 4
```

Example 2

Write a Prolog program that takes two integer inputs and prints the greater one.

```
domains
    i = integer

predicates
    greater(i, i)

clauses
    greater(X, Y) :- X > Y, write("the greater is", X).
    greater(X, Y) :- write("the greater is", Y).

goal
    greater(4, 3).
```

Output:

```
The greater is 4
```

Homework

1. Write a Prolog program that reads any phrase and then prints it.
2. Write a Prolog program that reads an integer number and then prints it after multiplying it by another integer such as 5