**Lec 5 Recursion Third class**

**Recursion:** recursive rule appears again in the body of the rule, where the requirements are specified.

A( condition)

AfA (conclusion):-

Recursive call

Recursion types

1. **Stack recursion**
2. Recursive call in the middle of the rule.
3. The saved state of execution must be stored in stack.
4. Stack recursion fast to implement.
5. **Tail recursion**
6. Recursive call in last step of rule.
7. Not saved in stack.
8. It is not fast as much as stack recursion.
9. More variables.

* لانجاح عمليه الاستداعاء الذاتي يجب توفر عبارتين:

1. شرط التوقف او جمله التوقف ( ينهي الاستداعاء الذاتي من اجل عدم الدخول بتكرار لا نهائي ).
2. جمله الاستدعاء ( ليتم تكرار جمله الاستدعاء لحين الوصول لشرط التوقف ).

Example ( 9 ) : write a prolog program to print numbers from 1 to 10 using ( Tail recursion)

predicates

count(integer).

clauses

count (11):- !.

count (X):- write (X), nl, Y=X+1, count(Y).

example (10 ) : write a prolog program to print number from 1 to 10 using (stack recursion)(للاطلاع )

predicates

count ( integer).

clauses

count(11):-!

count(X):- write (X), nl ,count(Y), Y=X+1 .

Example (11 ) :- write a prolog program to print number from 10 to 1 .

Predicates

a(integer).

clauses

a(0):-!.

a(X):- write(X), nl, X1=X-1, a(X1).

Goal: a(4)

**Goal Types**

**Single goal**: one goal.

**Compound goal**: a group of sub goals.

**Internal goal**: give one solution, written with code.

**External goal:** give all solution,written in goal window.

Example (12 ) :- run this program with this goal

Goal : player(P1,9), player(P2,9), P1 < > P2.

predicates

player(symbol,integer).

Run(symbol,integer).

clauses

player(peter,9).

player(paul,10).

player(chirs,9).

player(susan,9).

run(X,Y):- player(X,Y).