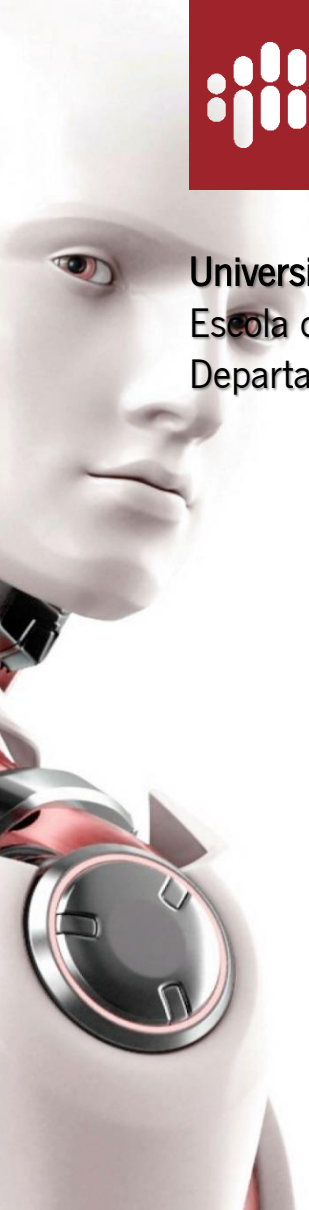
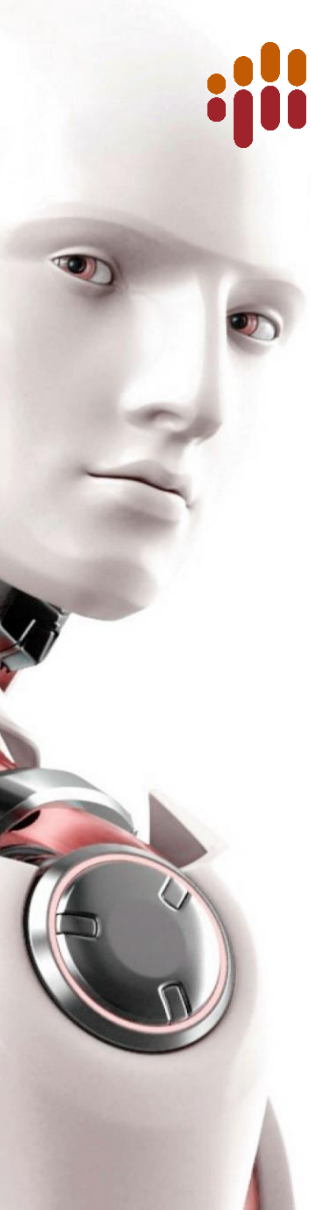


Universidade do Minho
Escola de Engenharia
Departamento de Informática

Prolog

Arithmetic

Mestrado Integrado em Engenharia Informática
Licenciatura em Engenharia Informática
Inteligência Artificial

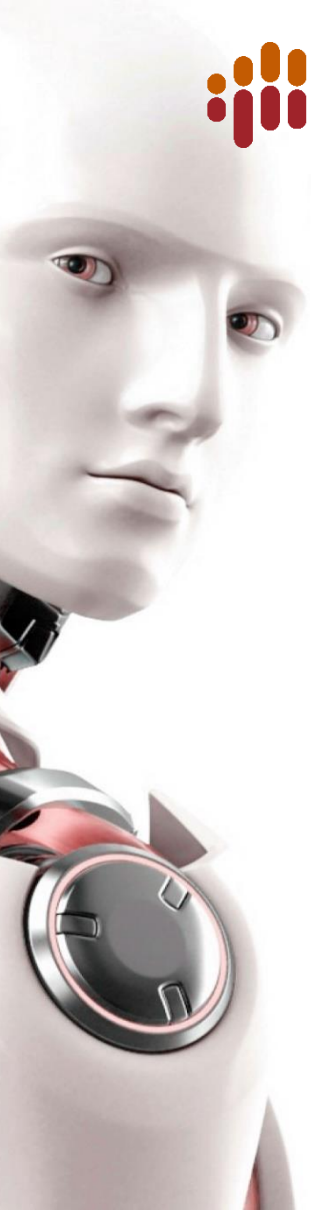


ISLab
Synthetic Intelligence Lab

Arithmetic in Prolog

- Prolog provides a number of basic arithmetic tools;
- Integer and real numbers.

Arithmetic	Prolog
2 + 3 = 5	?- 5 is 2+3.
3 x 4 = 12	?- 12 is 3*4.
5 – 3 = 2	?- 2 is 5-3.
3 – 5 = -2	?- -2 is 3-5.
4 □ 2 = 2	?- 2 is 4/2.
1 is the remainder when 7 is divided by 2	?- 1 is mod(7,2).



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Example queries

?- 10 is 5+5.

yes

?- 4 is 2+3.

no

?- X is 3 * 4.

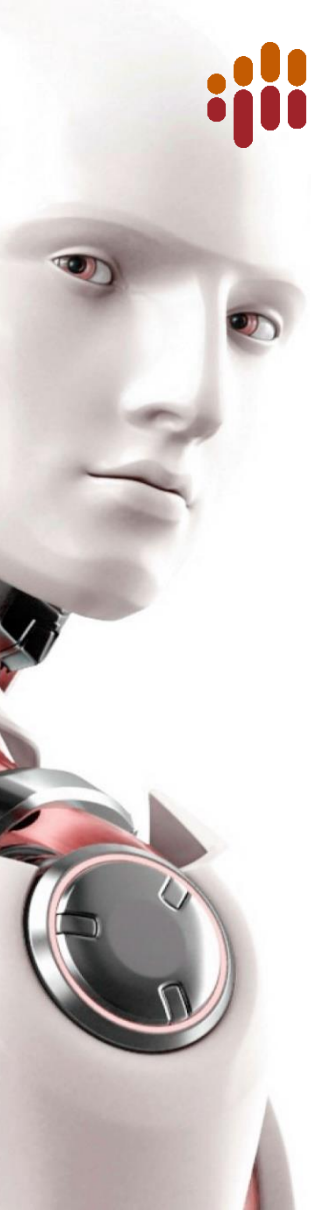
X=12

yes

?- R is mod(7,2).

R=1

yes



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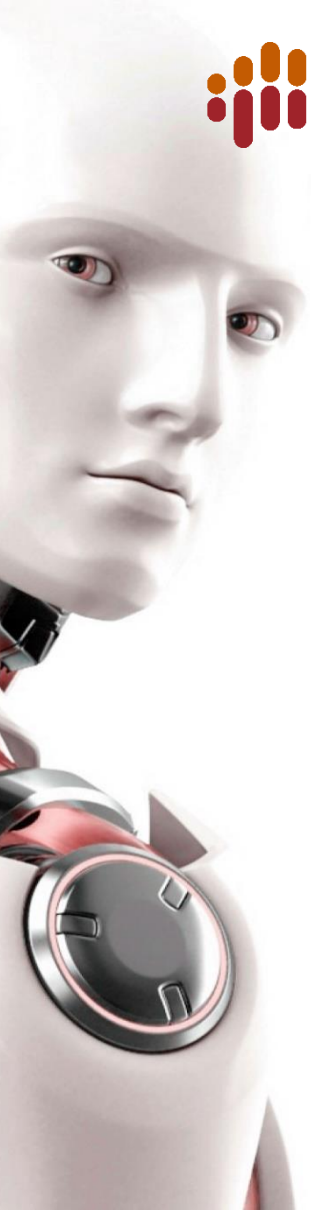
Arithmetic

- It is important to know that +, -, / and * do not carry out any arithmetic;
- Expressions such as 3+2, 4-7, 5/5 are ordinary Prolog terms;
  - Functor: +, -, /, *
  - Arity: 2
  - Arguments: integers



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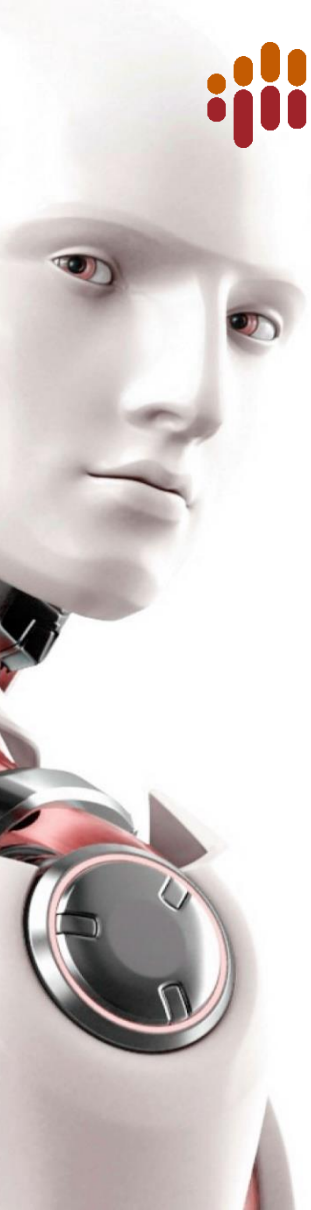
The is/2 predicate

- To force Prolog to actually evaluate arithmetic expressions, use:

  is

- This is an instruction for Prolog to carry out calculations;
- Because this is not an ordinary Prolog predicate, there are some restrictions.



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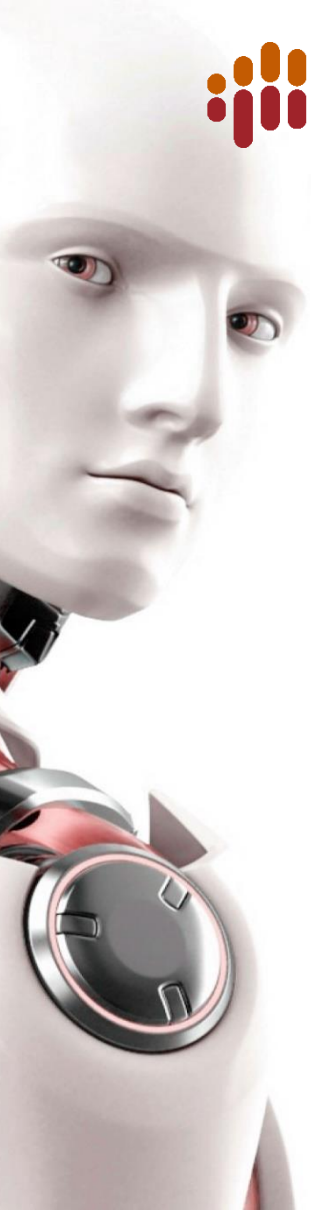
Restrictions on use of is/2

- Use variables on the left hand side of the **is** predicate;
- The variables must be instantiated with a variable-free Prolog term;
- This Prolog term must be an arithmetic expression.



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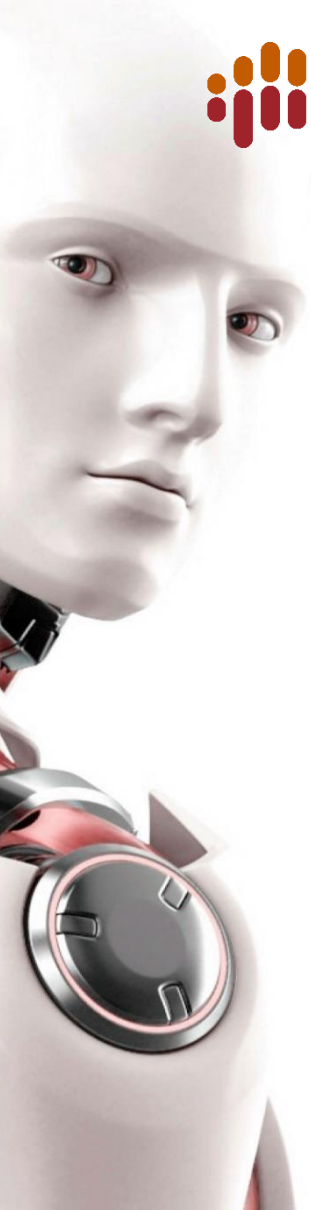
Comparison Operators

- Have the obvious meaning;
- Force both left and right hand argument to be evaluated.

```
?- 2 < 4+1.
yes

?- 4+3 > 5+5.
no
```



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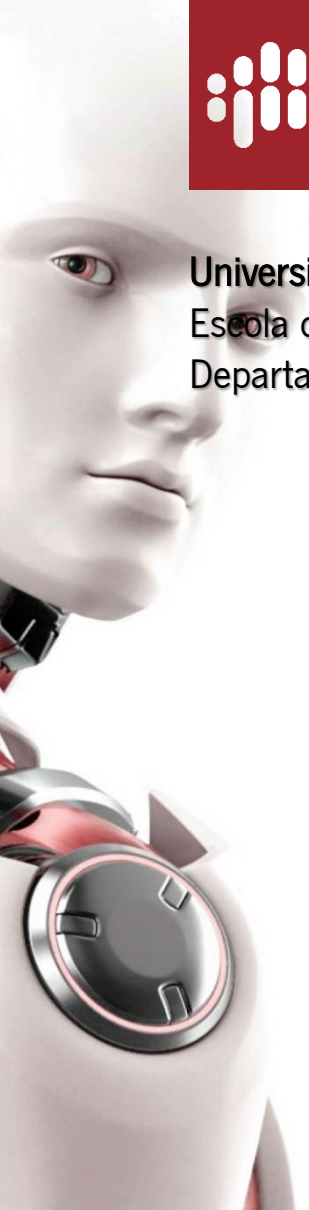
Comparison Operators

- Have the obvious meaning;
- Force both left and right hand argument to be evaluated.

```
?- 4 = 4.
yes
?- 2+2 = 4.
no
?- 2+2 =:= 4.
yes
```



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Prolog

Recursion

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