

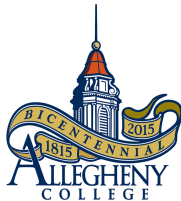
# *CS201 - PL'S*

## Logical Programming - Prolog

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## Japan's "Fifth Generation" project–1982:

([https://en.wikipedia.org/wiki/Fifth\\_generation\\_computer](https://en.wikipedia.org/wiki/Fifth_generation_computer))

“These Fifth Generation computers will be built around the concepts of logic programming.”

- The use of logic to express information in a computer.
- The use of logic to present problems to a computer.
- The use of logical inference to solve these problems.

# The Fifth Generation Project

- “The project imagined a **parallel processing** computer running on top of massive **databases** (as opposed to a traditional filesystem) using a **logic programming language** to define and access the data.”
- Depending on who you ask, the Fifth Generation project was either “Ahead of its time” or was a failure.

# Prolog Basics

- Program consists of a database of **facts** and a set of **rules**.
- Facts are expressed as “predicates” –the programmer supplies the meaning.

```
parent(hank,ben). % "hank is a parent of ben"  
isa(swan,bird).  % "a swan is a bird"  
required(cs101). % "cs111 is required"  
prereq(cs101,cs102).  
eats(unicorn,rose).  
stooges(moe,larry,curly).
```

- Constants (“atoms” and names of predicates) begin with lower-case letters; variables are capitalized.
- Rules specify conditions that must hold for a predicate to be true:

```
grandparent(X,Y) :- parent(X,Z),parent(Z,Y).
```

- This means “ $X$  is a grandparent of  $Y$  if there exists a  $Z$  such that  $X$  is a parent of  $Z$  and  $Z$  is a parent of  $Y$ .” The symbol “:-” should be read as “if” and a comma should be read as “and”.

- A program is more like a database of facts and rules.
- We solve problems by querying this database.

## How does it work?

- Prolog tries to match the pattern of the query with one of the facts or with the left-hand side of one of the rules.
- If a fact is found, we are done
- Otherwise we recursively query each of the terms in the right-hand side of the rule:

Ready for examples?



## **PLP** Chapter 11

# Questions

Do you have any questions from this class discussion?