Knowledge-based systems

data, information, knowledge

purpose

ill-structured problems: when the problem is impossible or difficult to formalize

an efficient algorithm in unknown, only rules

input data are incomplete, inconsistent and/or uncertain

knowledge may change

and an intelligent solution is expected

examples
planning, diagnostics, robotics, games ... 

how to solve it:

separate knowledge and computation
Knowledge-based systems

Knowledge-based system

*knowledge base* – knowledge for solving the problem, or class of problems

*inference engine* – reasoning

*database* – facts about the particular problem solved

*user interface*

*explanation mechanism*
Building a knowledge-based system

Design and implementation

choose a knowledge representation

and a suitable inference engine (IE)

build an interface between IE and the knowledge base

implement the inference engine

and the supporting modules

Put general knowledge into the knowledge base

Build the application
Building a knowledge-based system: An example

choose a knowledge representation

prolog clauses; rules

and a suitable inference engine (IE)

Prolog inference engine; metainterpreter

build an interface between IE and the knowledge base

listing, trace; to implement

implement the inference engine

and the supporting modules

Put general knowledge into the knowledge base

Build the application