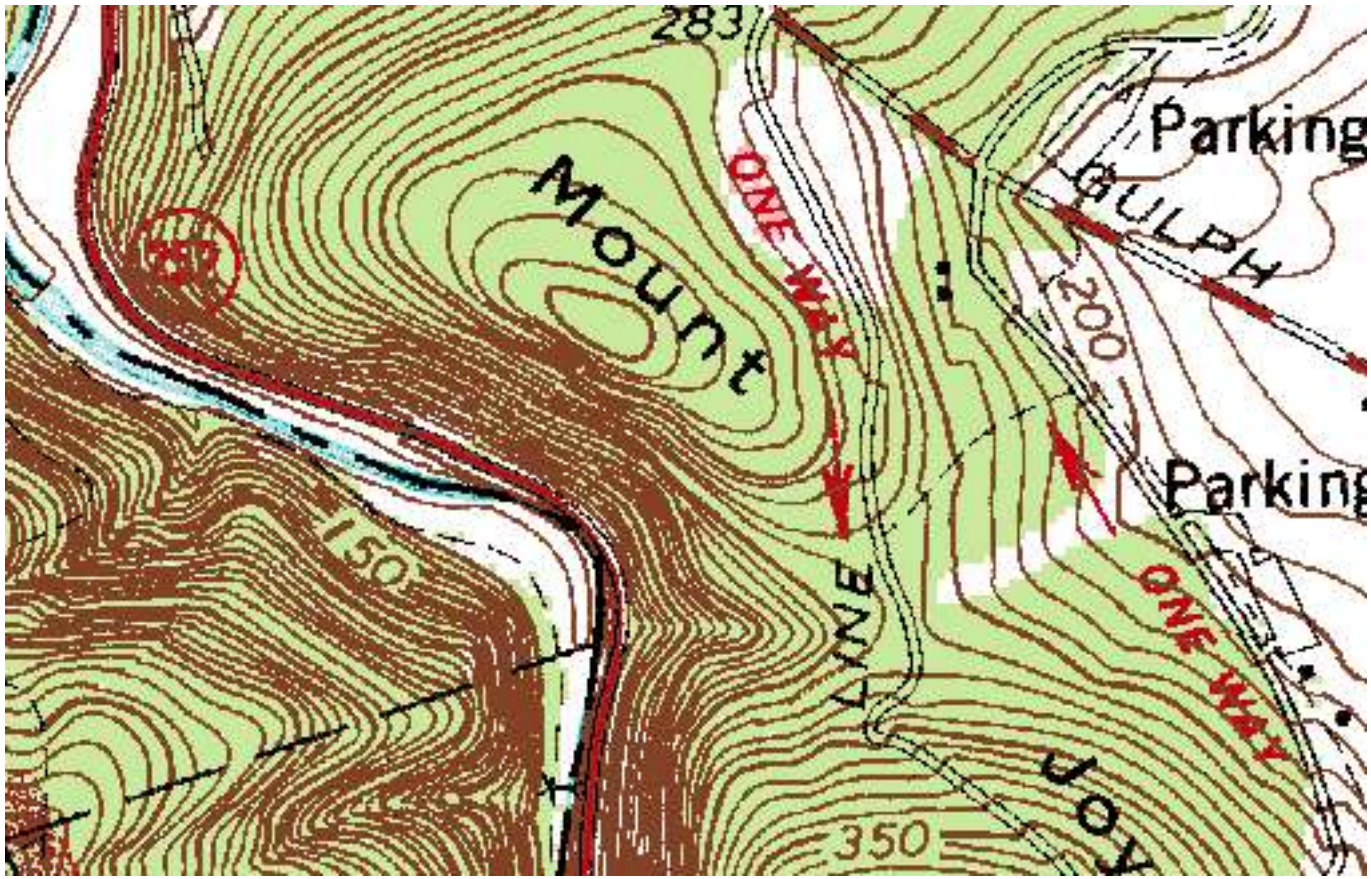
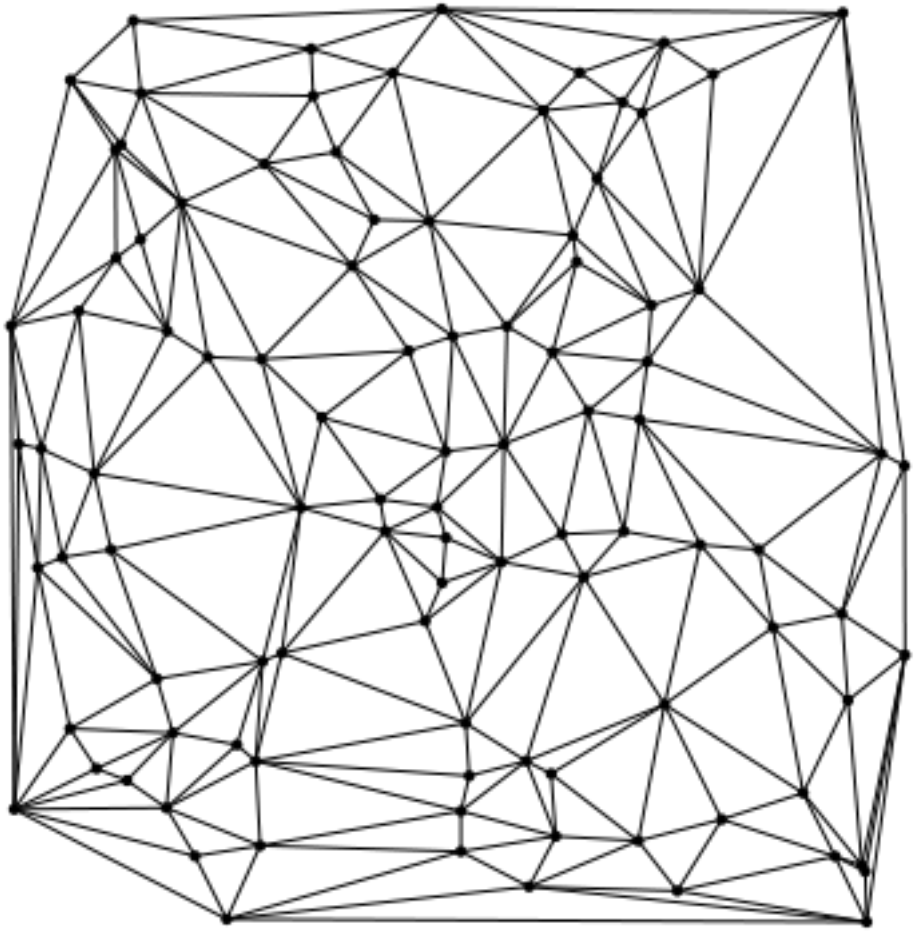
Project examples

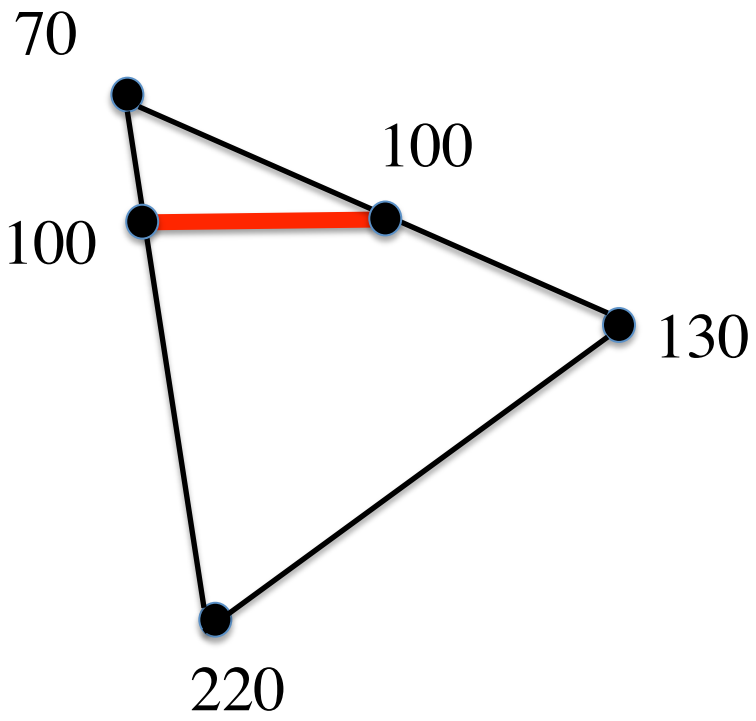
Contour lines



Triangulation

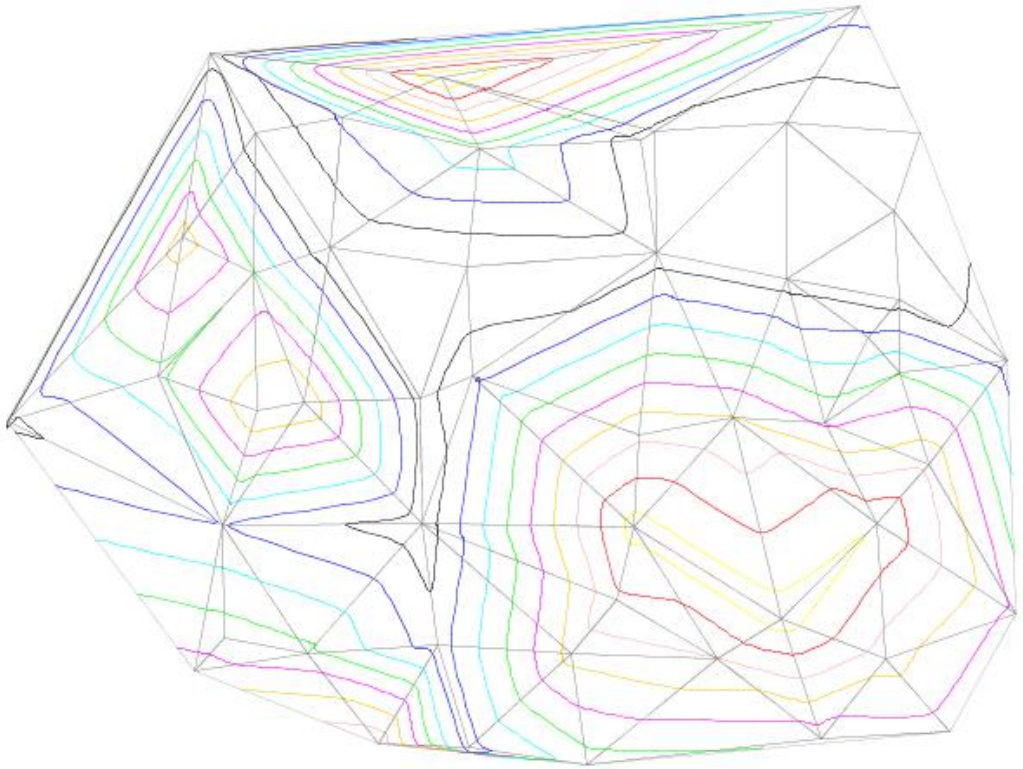


Interpolation

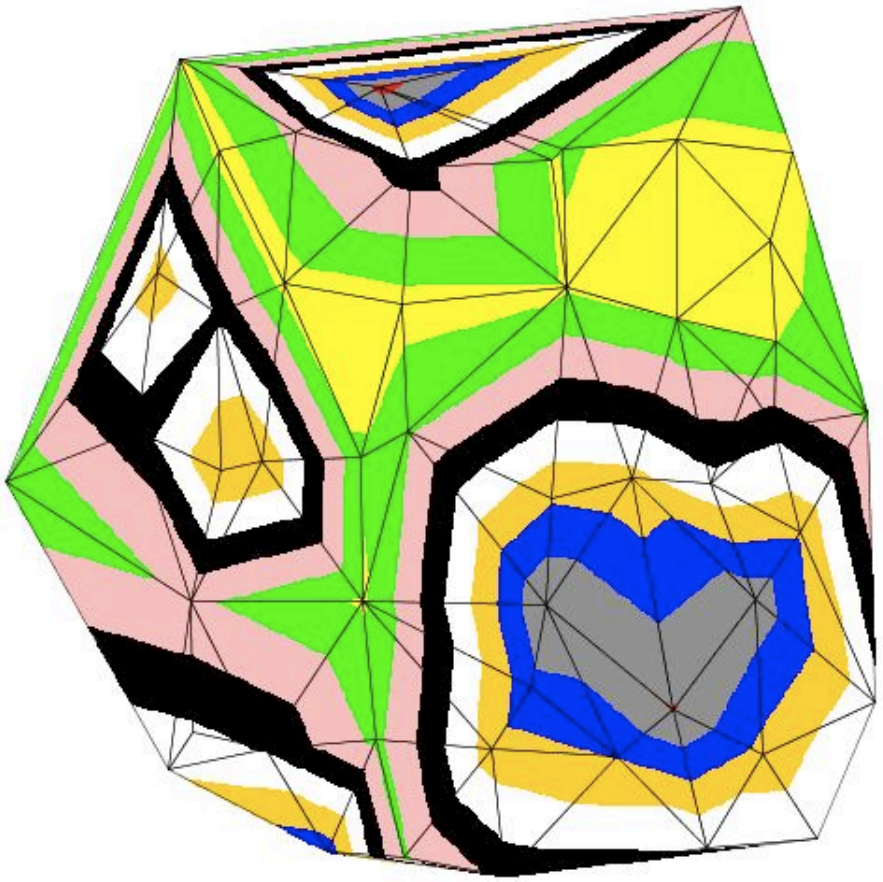


We want to draw the contour line for 100

Contour lines



Contour map



Automatic theorem proving

- **Theorem proving**:
  to show that a statement follows logically from some other statements

- **Automatic theorem proving**:
  a mechanization of the proof

Example

- Given the following 2 statements:

  All humans are mortal.
  Socrates is a human.

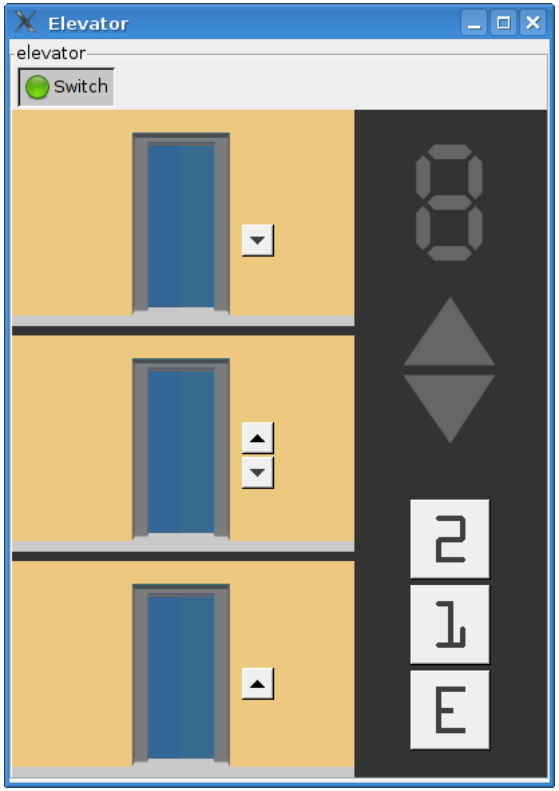
- Show that we may conclude that:

  Socrates is mortal.

More advanced example

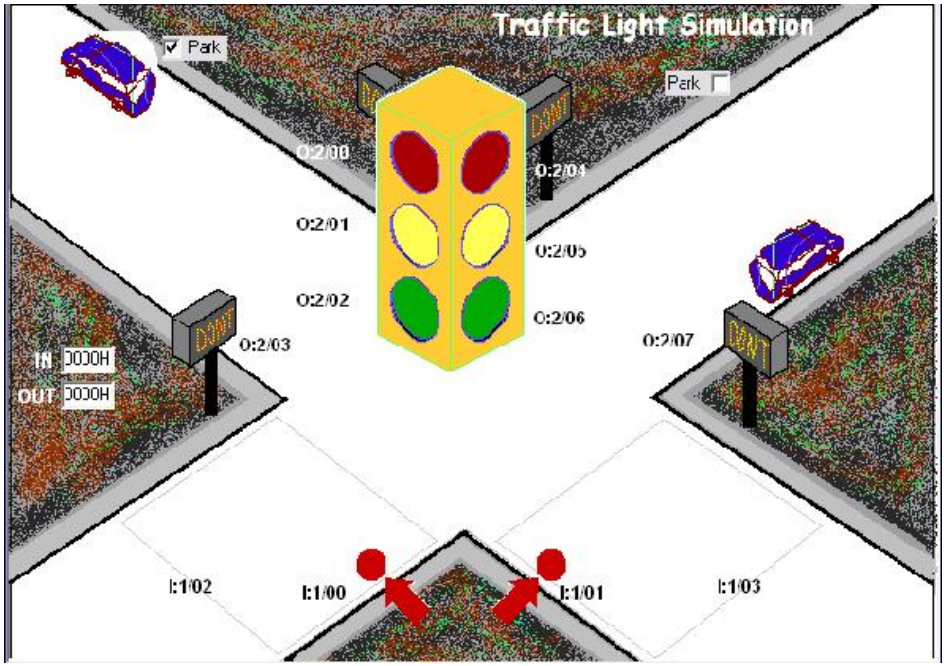
Tony, Mike, and John belong to the Alpine Club.
Every member of the Alpine Club is either a skier or a mountain climber or both.
No mountain climber likes rain, and all skiers like snow.
Mike dislikes whatever Tony likes and likes whatever Tony dislikes.
Tony likes rain and snow.
Who is a member of the Alpine Club who is a mountain climber but not a skier?

Elevator simulator



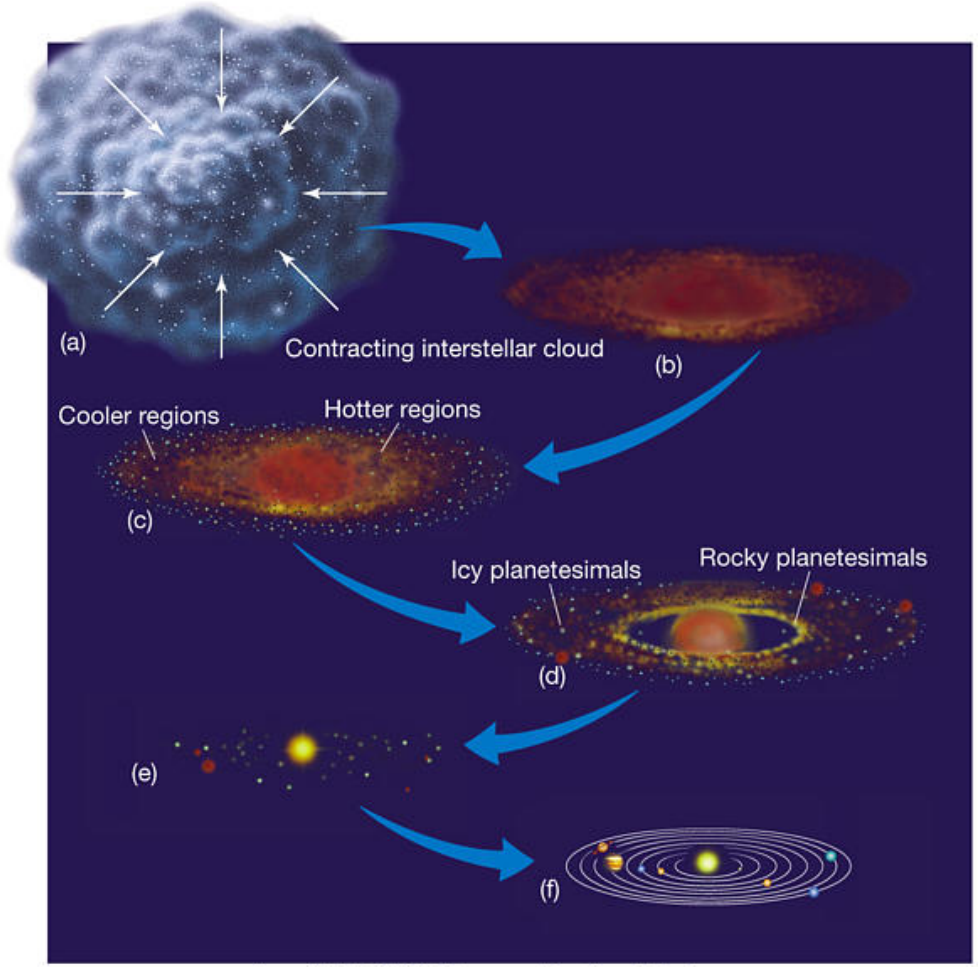
A comparison of three different simulation approaches (event, activity, process)

Optimization in simulation



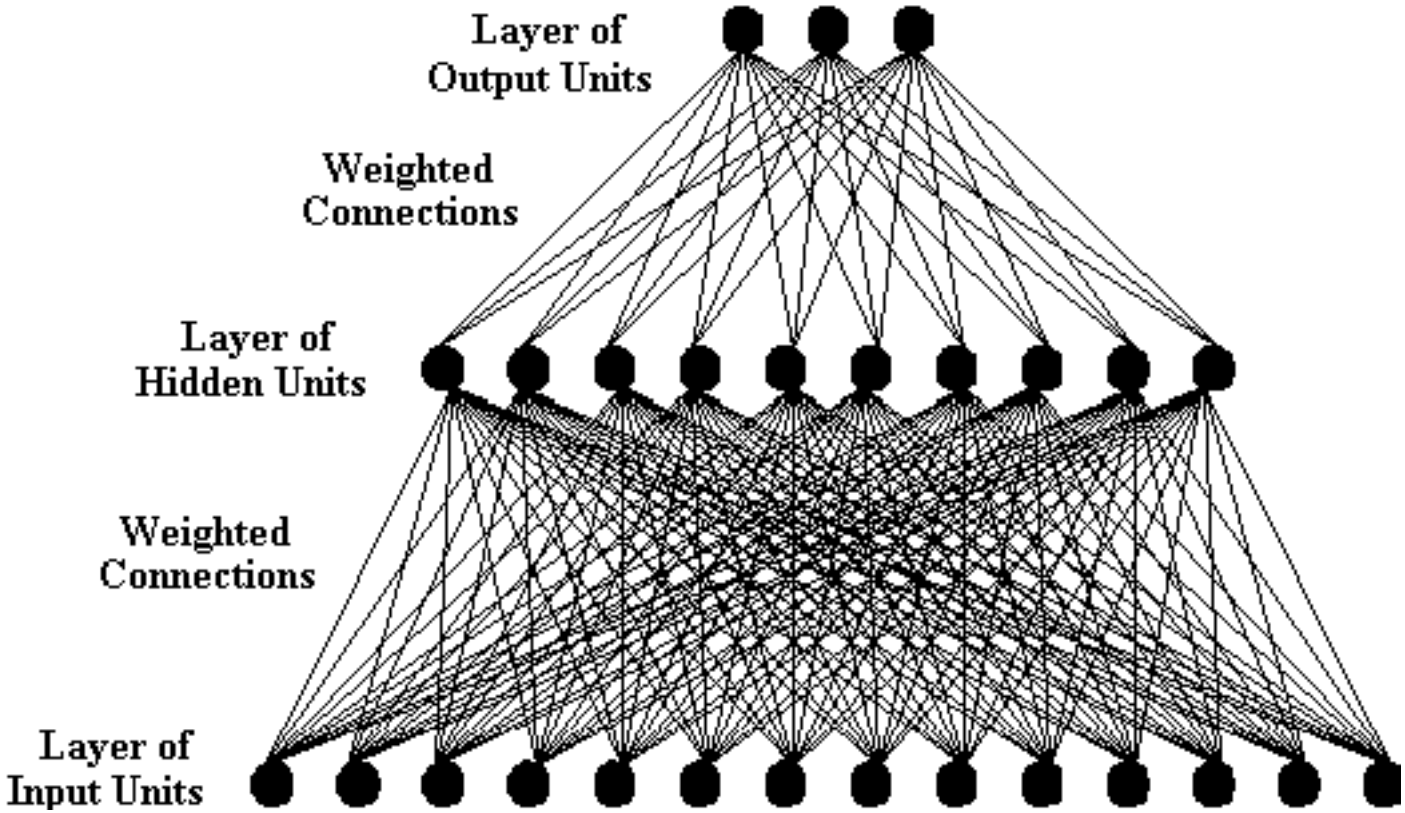
Optimize traffic signal light

Formation of our solar system



Face recognition

Neural network



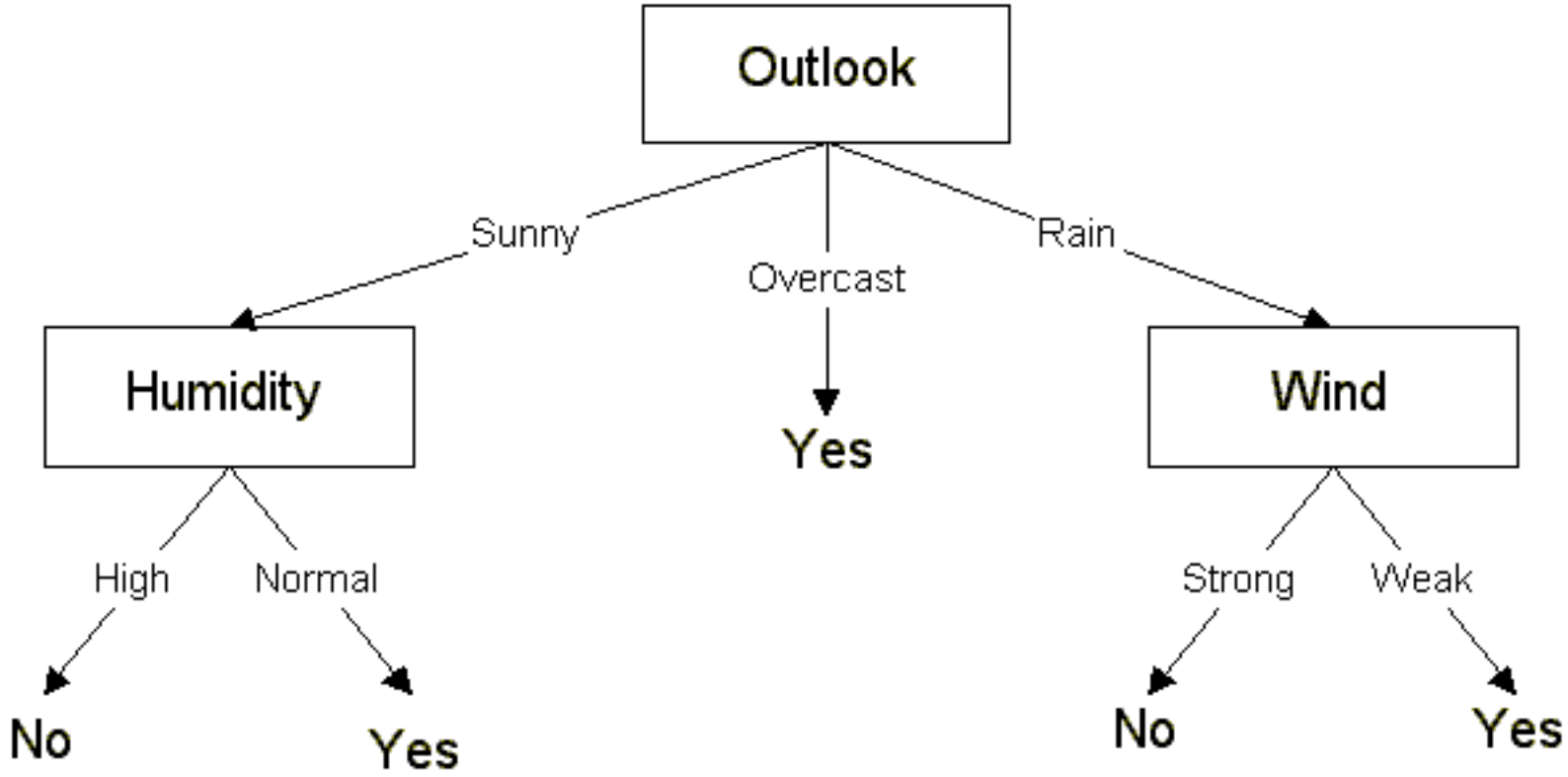
Induction of rules by ID3

Input:

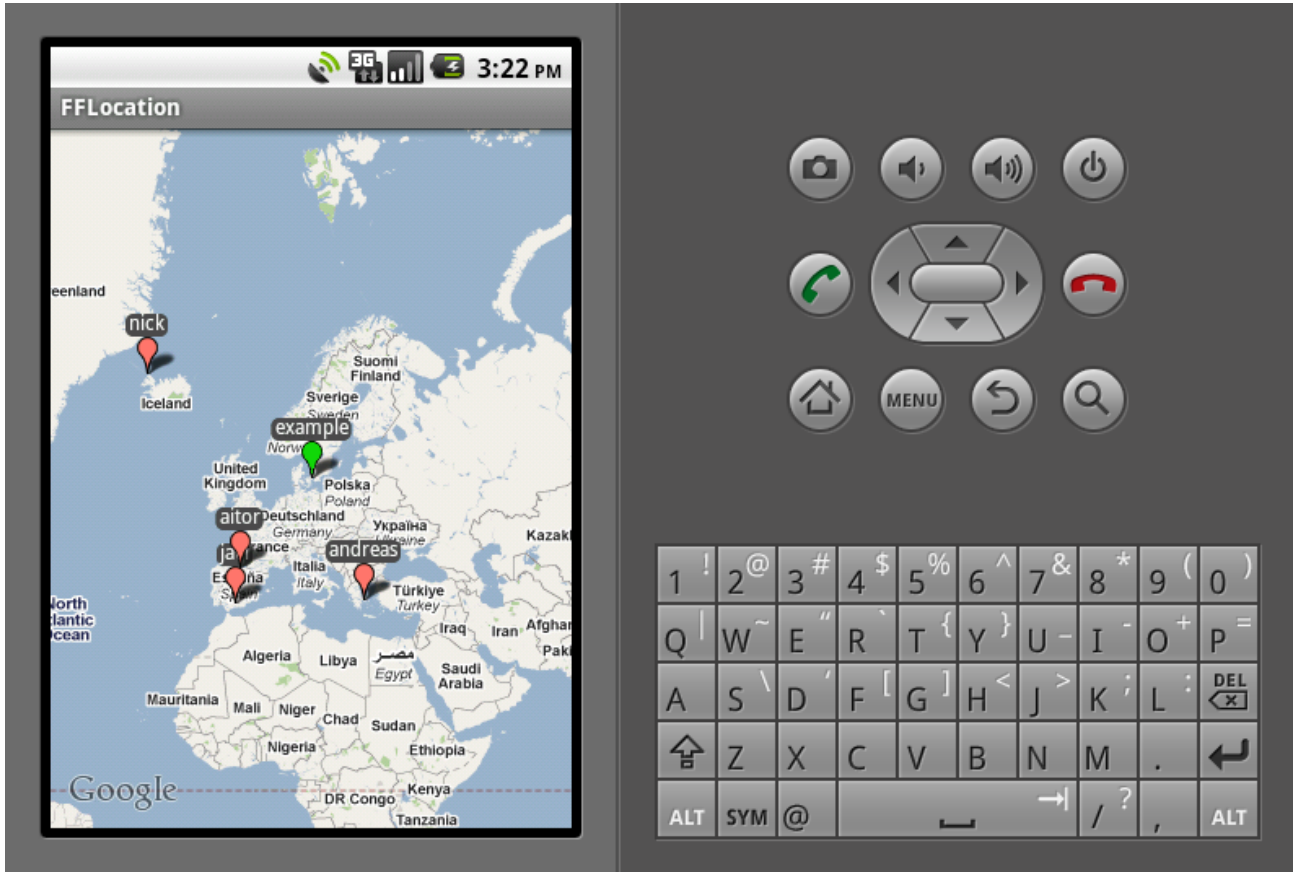
Outlook	Temperature	Humidity	Wind	Play ball
Sunny	Hot	High	Weak	No
Sunny	Hot	High	Strong	No
Overcast	Hot	High	Weak	Yes
Rain	Mild	High	Weak	Yes
Rain	Cool	Normal	Weak	Yes
Rain	Cool	Normal	Strong	No
Overcast	Cool	Normal	Strong	Yes
Sunny	Mild	High	Weak	No
Sunny	Cool	Normal	Weak	Yes
Rain	Mild	Normal	Weak	Yes
Sunny	Mild	Normal	Strong	Yes
Overcast	Mild	High	Strong	Yes
Overcast	Hot	Normal	Weak	Yes
Rain	Mild	High	Strong	No

Decision tree

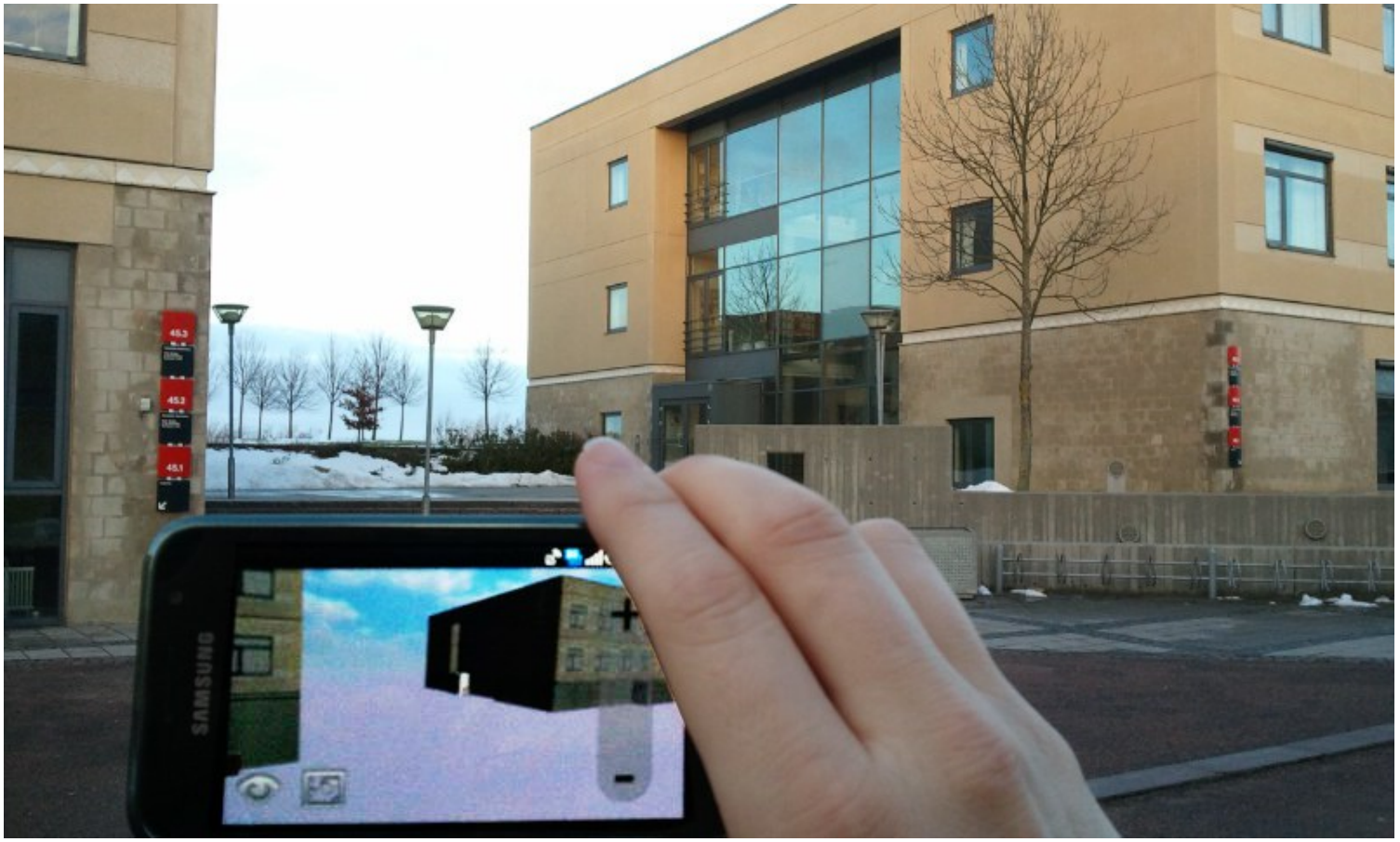
Output:



Find Friend Location



AndroidRUC3D

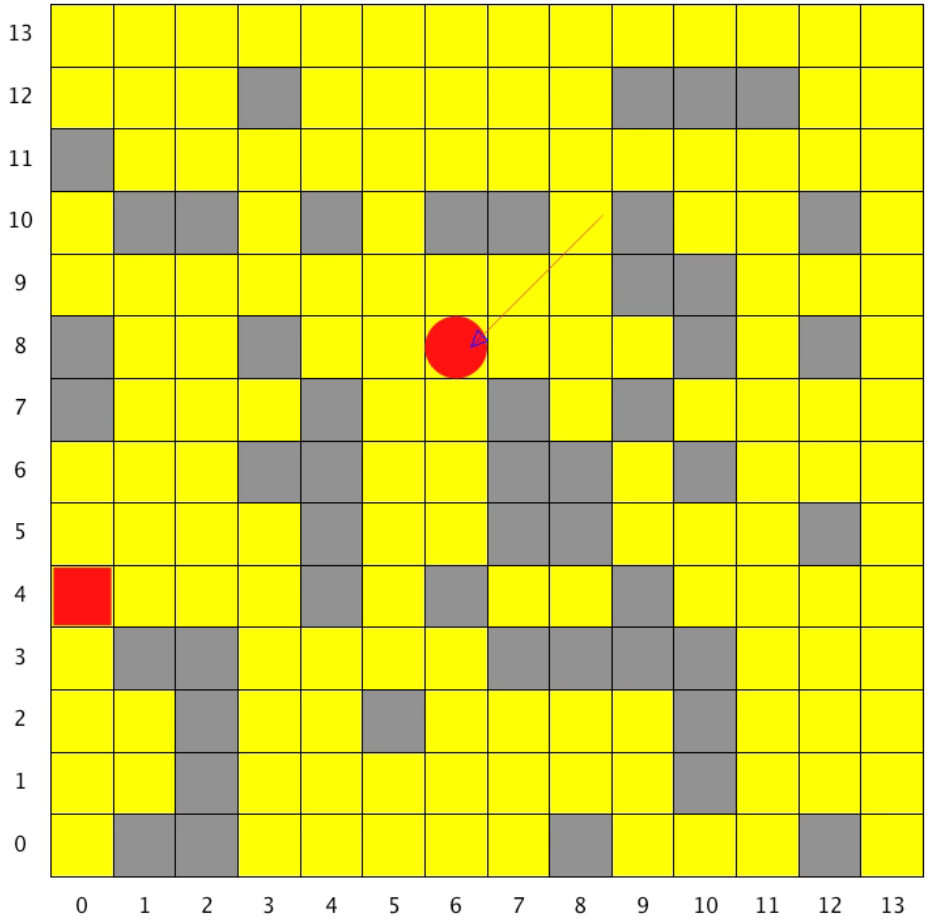


Object Transport for IOS


```
@interface ChatServerPacket : NSObject <NSCoding> {
  NSString *command;
  NSDictionary *components;
  AsyncSocket *socket;
}

@property(nonatomic, retain) NSString *command;
@property(nonatomic, retain) NSDictionary *components;
@property(nonatomic, retain) AsyncSocket *socket;
```

Path Finding Robot Simulator



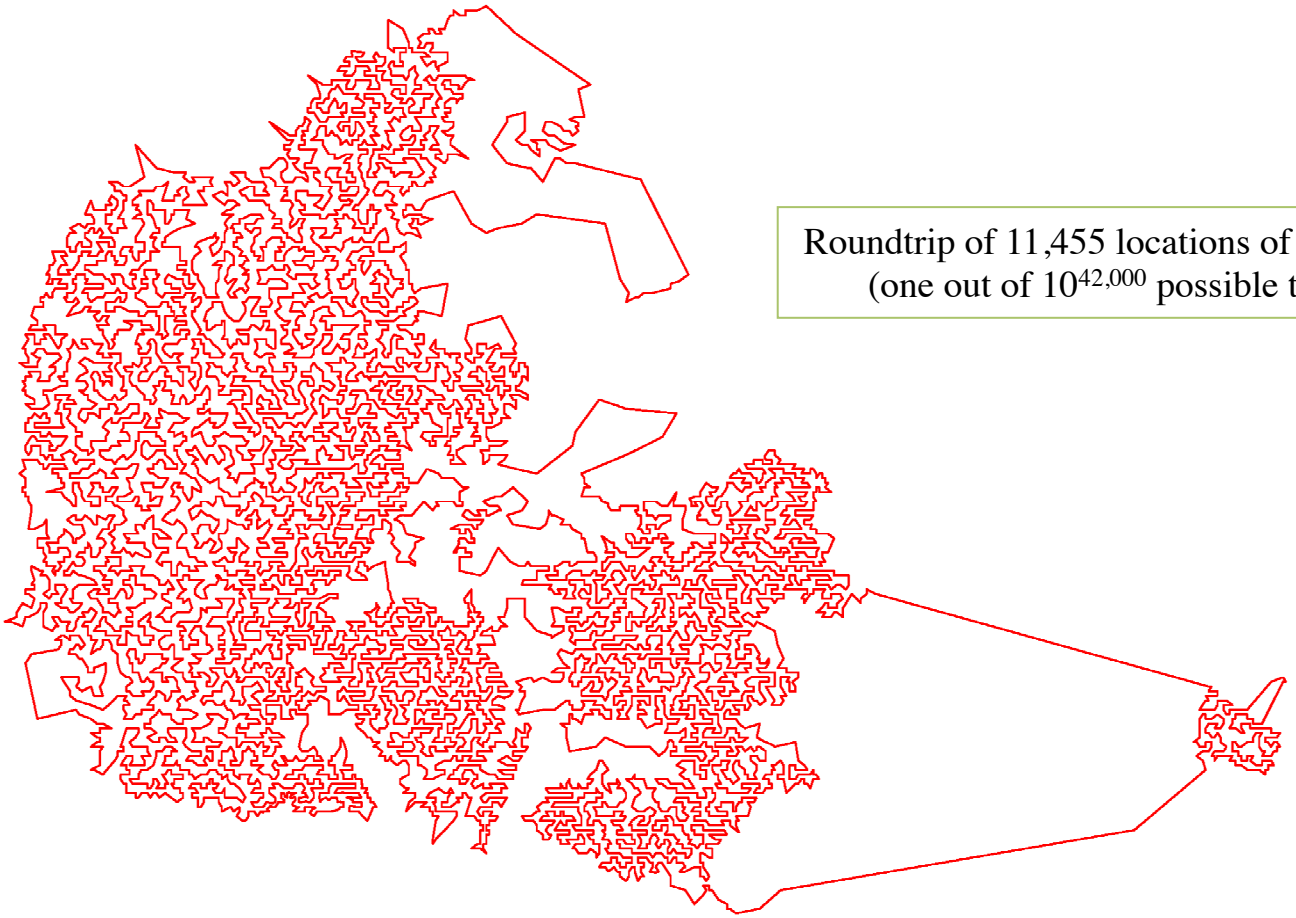

THE
END

Formal requirements

This module's main focus is the construction and development of computer software. The aim is to provide the students with the basic skills, competences, and understanding of computer science as a research area and software construction and development as disciplines. The module comprises of courses and a project that underline its focus. The project has to include the planning, implementation, testing, and documentation of a medium-sized programming ~~assignment~~ project.

Workload for the project: 1/2 semester (15 ECTS)

The Traveling Salesman Problem



Roundtrip of 11,455 locations of Denmark
(one out of $10^{42,000}$ possible tours)

Ant colony optimization

Each ant leaves a trail of pheromones when it explores the solution landscape. This trail is meant to guide other ants.

The trail will be taken into account when an ant chooses the next location to move to, making it more prone to walk the path with the strongest pheromone trail.

Timetabling

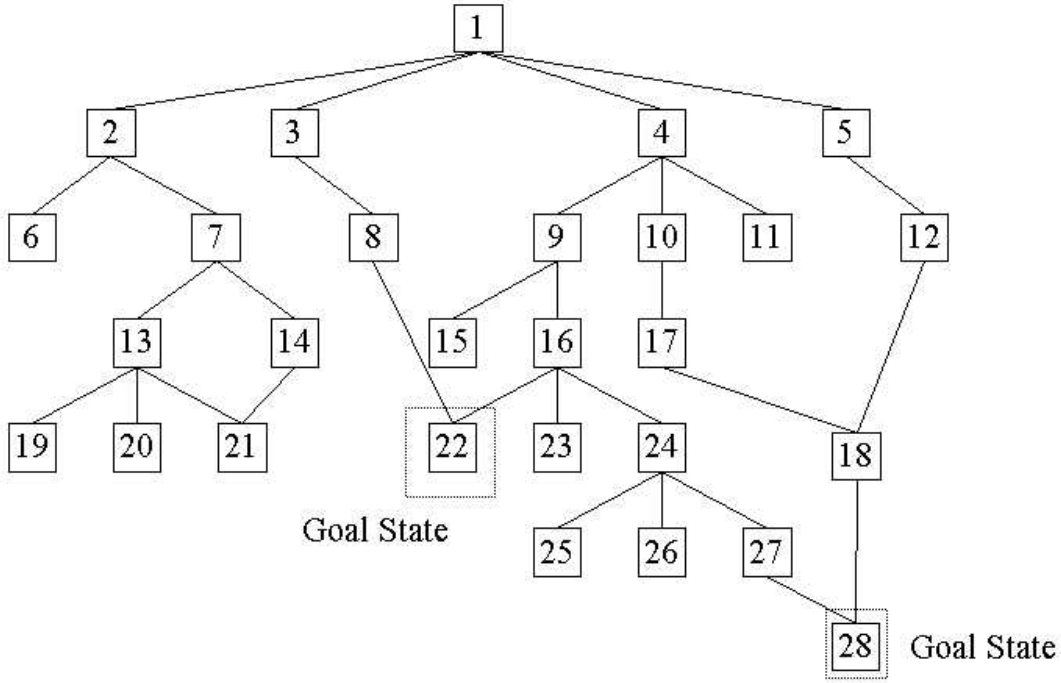
Assign a number of events to a limited number of time periods.

Course planning: Assign each lecture to some period of the week in such a way that no student is required to take more than one lecture at a time.

International Timetabling Competition:
http://www.idsia.ch/Files/ttcomp2002/

A general problem solver

An Example Search Space



A program for playing checkers

Game tree