Wrocław University of Technology

Intelligent Tourist Information System

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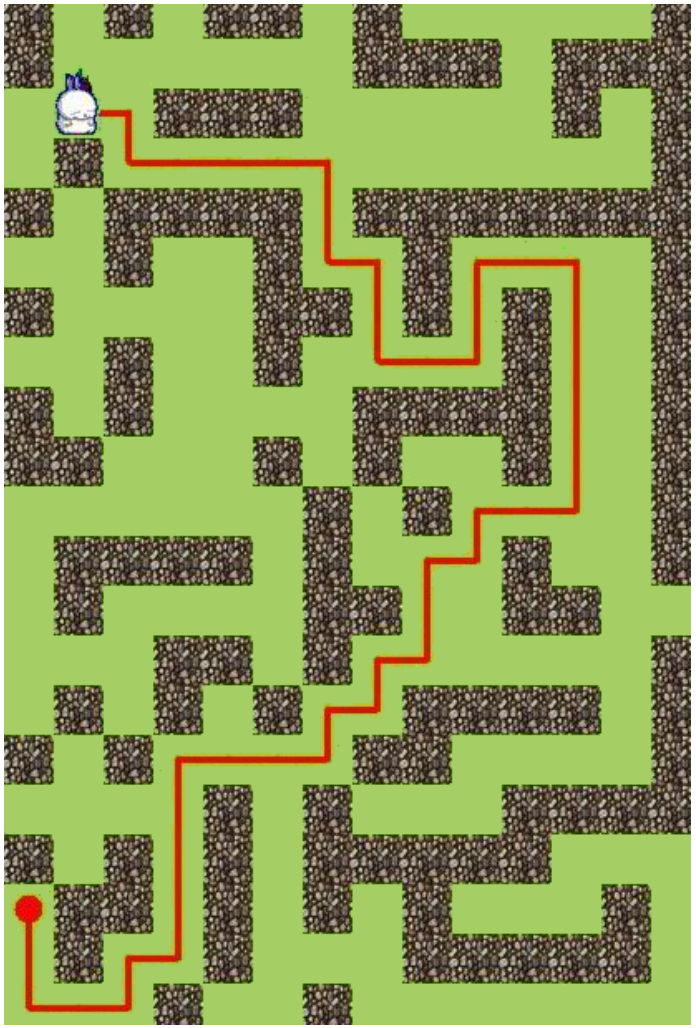
Agenda

- Introduction
- Research questions
- Problems & Solutions
- Presentation of the application
- Future Work
- Conclusions
- Summary

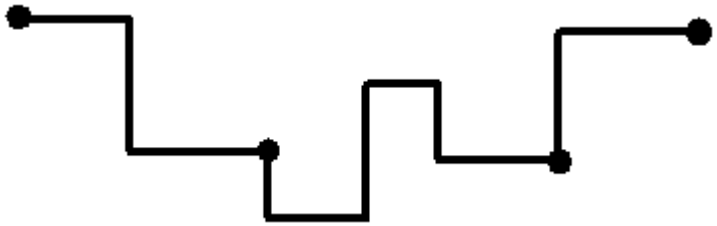
Introduction

- Problem
  - visiting new city – what to see?
  - selecting objects and path finding
- Designed for mobile devices
- Tourist Information
- Navigation
- Existing finding paths applications
  - AutoMapa, IGO, TomTom



Differences to existing applications

- Existing applications:
  - How to get to the target
  - One path



- Intelligent Tourist Information System
  - Selecting targets and path finding
  - Proposition of trips

Research Questions 1/2

- Is it possible to build a complete Tourist Information System and to get satisfying results?
- What are the weaknesses of existing GPS systems and applications for path finding?
- What are the user expectations from a such system? Can they be fulfilled using existing devices?

Research Questions 2/2

- Which algorithm for path-finding will be the best to fulfill user requirements and needs while travelling (different criteria, maybe two or more algorithms should be used for best search results)?
- How to organize data for most optimal memory consumption?
- How to build a vector map?

Problems & Solutions

Problems in the scope of the thesis:

- How to get a vector map? How to build it?
- Data structures – how to fit in memory?
- Drawing a map
- Selecting objects to visit
- Path finding
  - between objects while building a trip
  - on a map

Problem 1 - Vector map of the city

- Buying a map

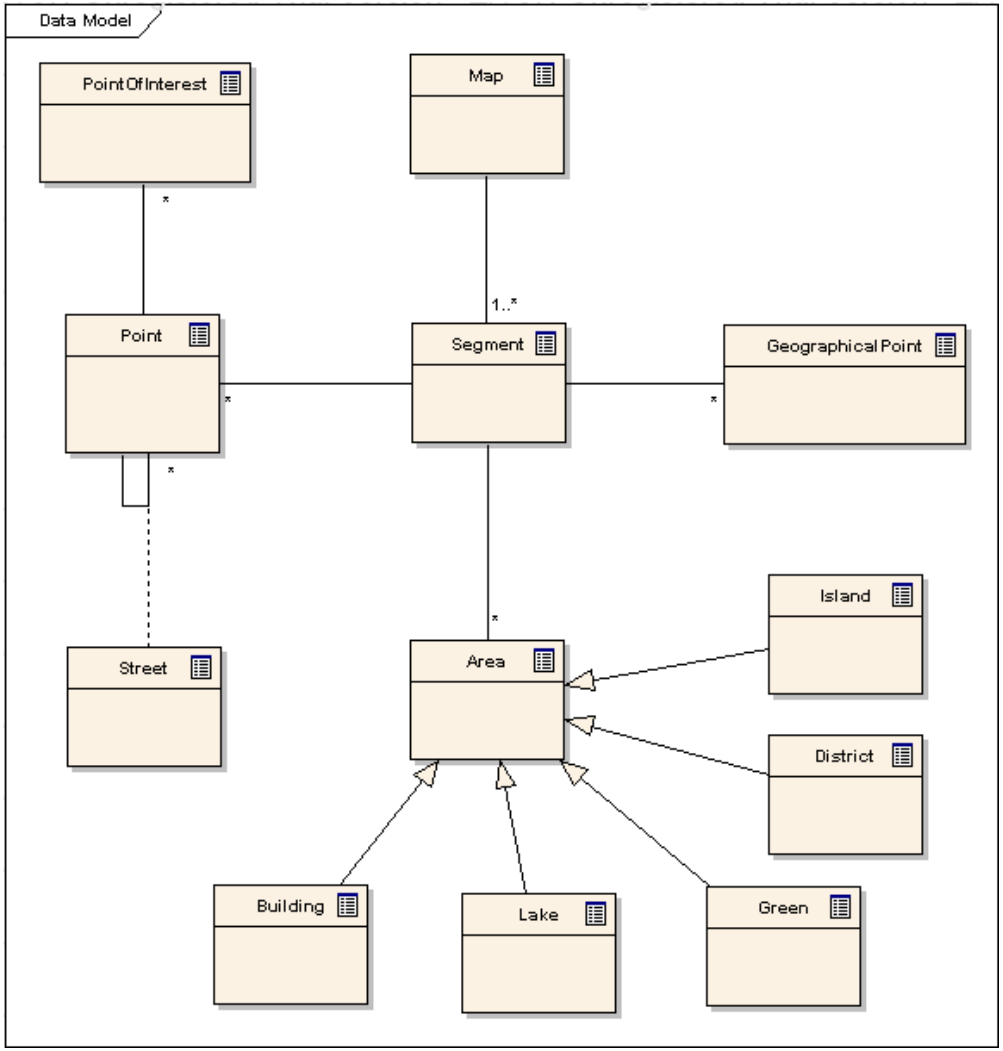
- Building a map
  - a raster map is needed
  - automation
  - MapBuilder software

- Gathering data about objects
  - Points of Interest database

Problem 2 - Data structures

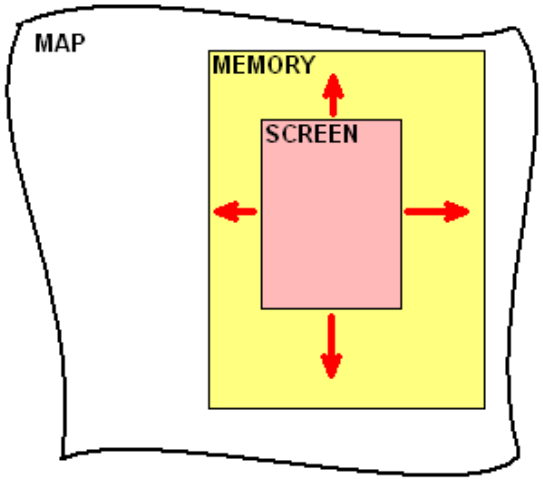
Features:

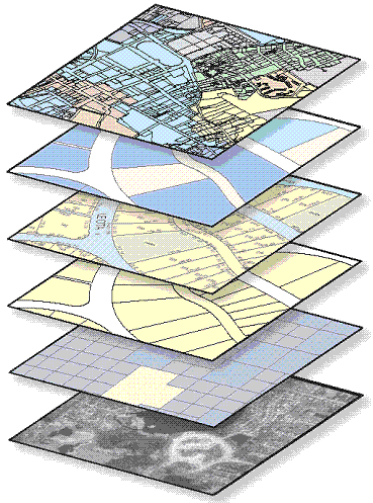
- fast searching
  - selecting visible objects
  - finding a place which was clicked by a user
- small



Problem 3 - Drawing map

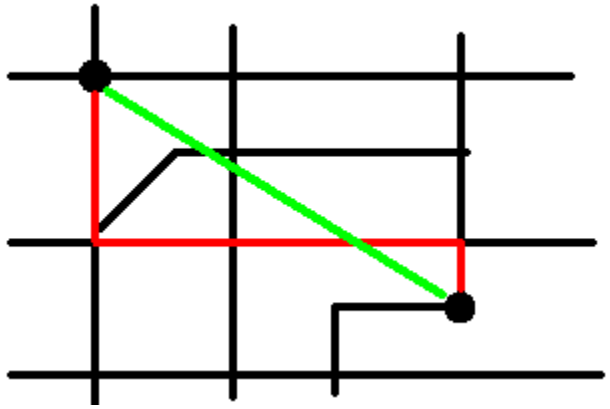
- Drawing only a visible part
  - selecting visible objects
- Scrolling (flickering) & zooming
- Layers
  - areas:
    - » the sea
    - » islands
    - » lakes, rivers
    - » islands
    - » buildings, parks
  - streets
  - POIs





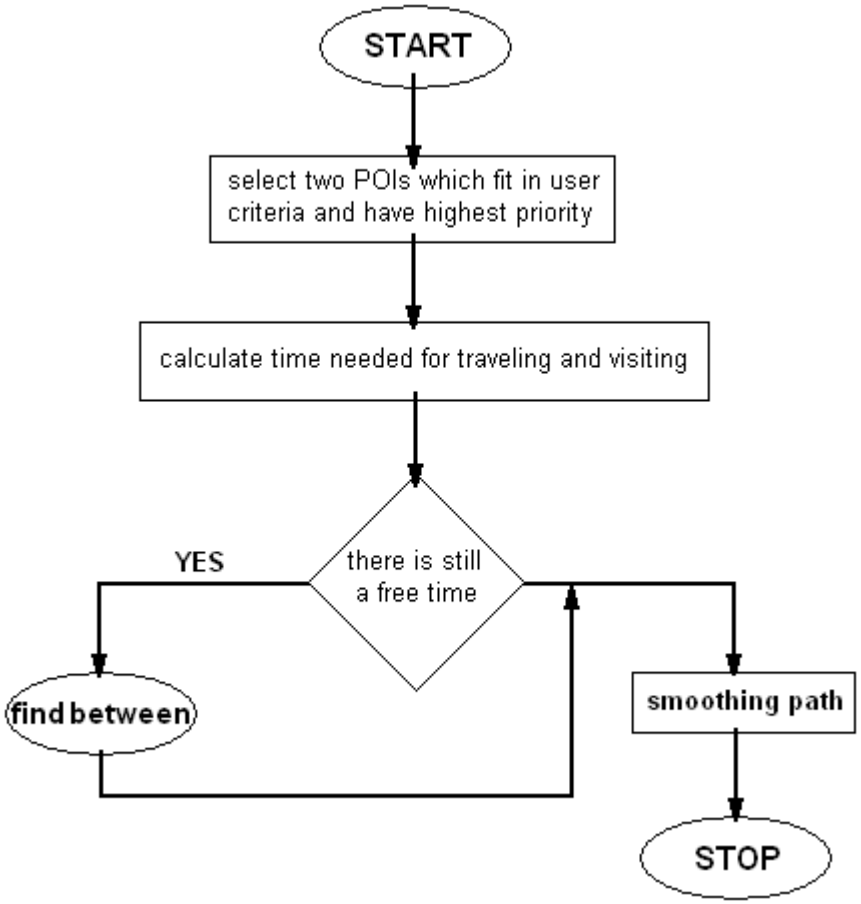
Problem 4 - Selecting POIs to visit

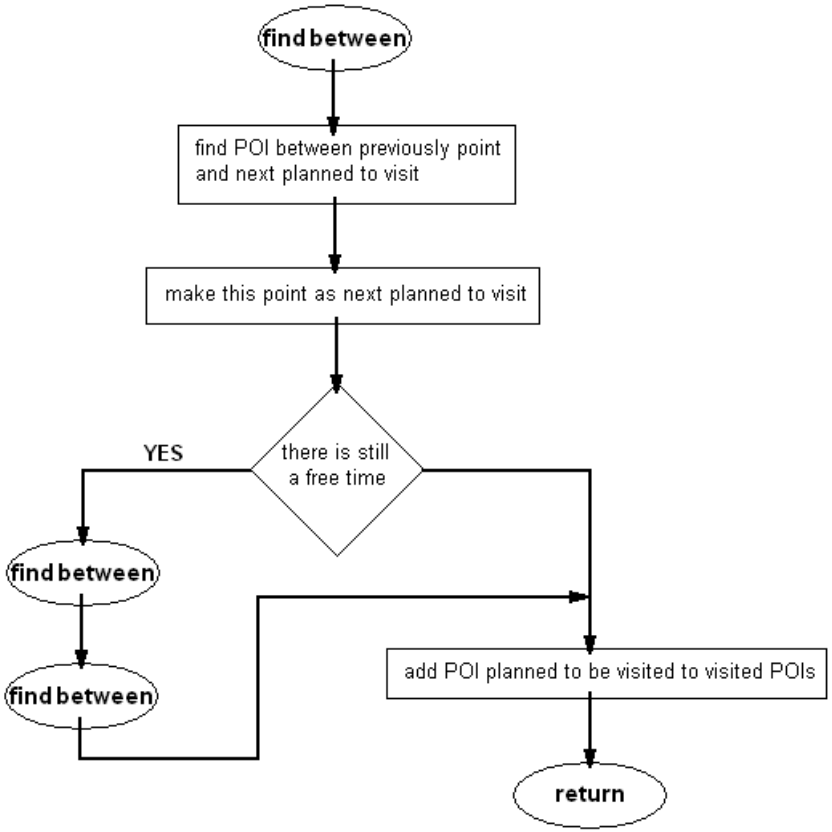
- Criteria for objects selecting
  - time for a trip
  - transport
  - visiting style
- POI categories
- Assumption
  - real path = $\sqrt{2}$ * distance
  - connectivity of the graph



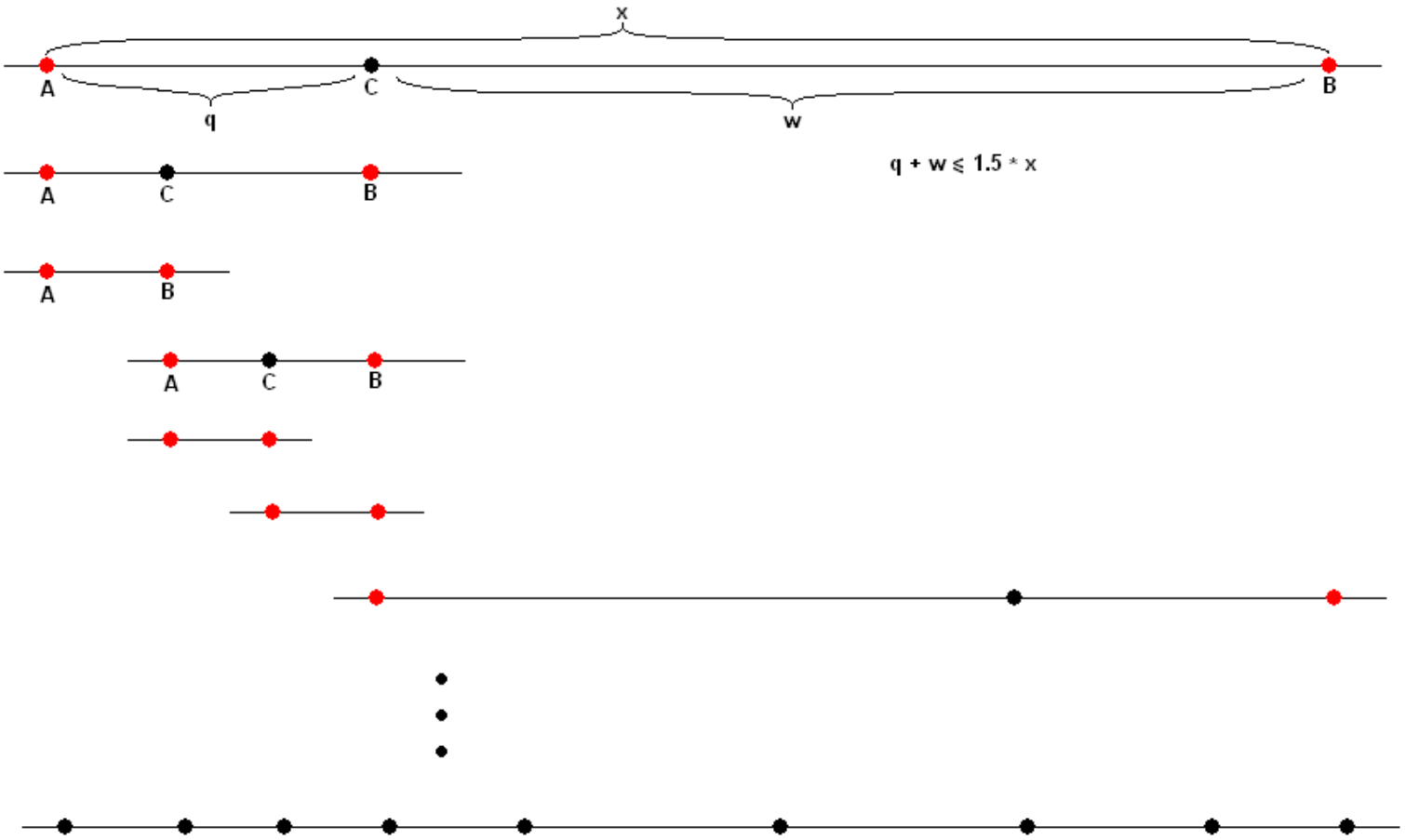
- Show propositions in short time period
- Solutions evaluation

Problem 4 - Selecting algorithm



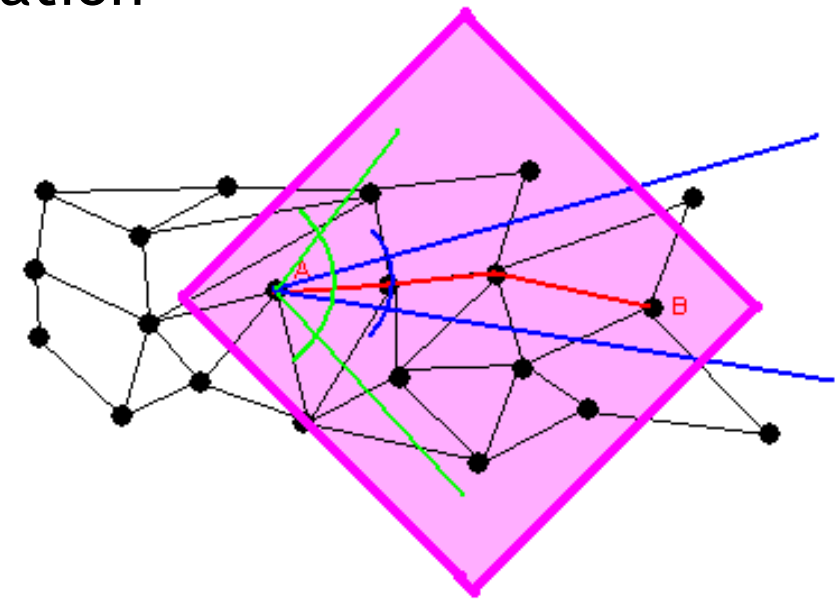


Problem 4 - Path building process

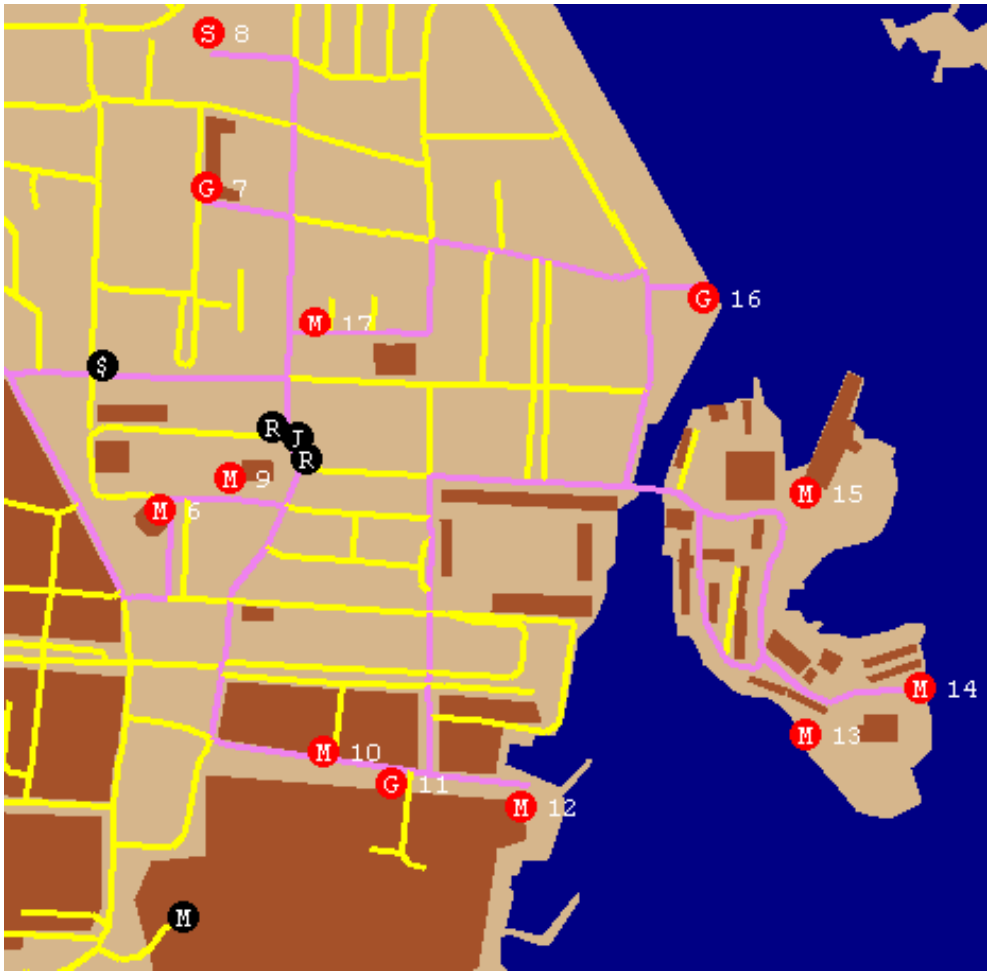


Problem 5 - Finding a path on the map

- Finding the shortest paths
- Using the Dijsktra's algorithm
  - Adopting the Dijsktra's algorithm to the specific situation



Example solution



Presentation of the application

Future Work

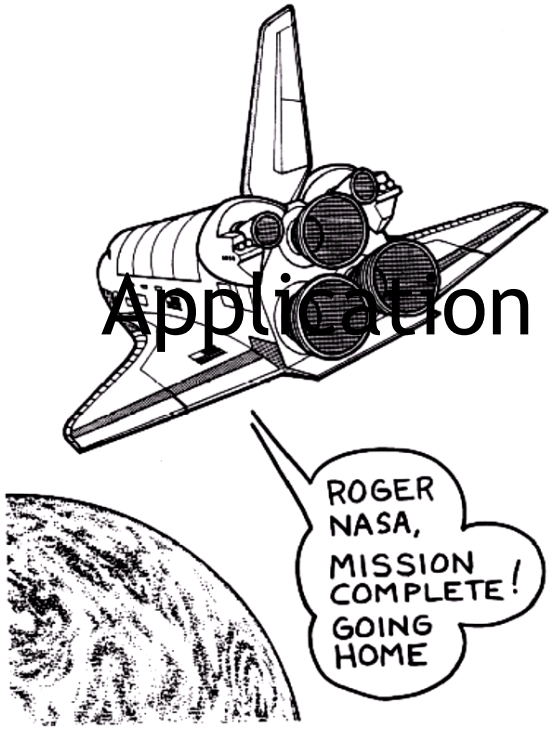
- Improving the path “smoothing” algorithm
- Symbian OS application
  - incomplete implementation
  - graphic tests were performed
- Map rotation
- Objects search mechanism
- Using a GPS receiver
  - leading and navigation

Conclusions

- It is possible to build a system for mobile devices which can fulfill and help tourists
- Weaknesses of existing GPS systems were presented
- Data organization was described and implemented
- Process of map building was described

Summary

- the Karlskrona map was built
  - the POIs database was prepared
  - part of a map of Wrocław was vectorized
- the algorithm to trip finding was designed
- the Windows Mobile Application was implemented
  - the Symbian OS application is still in implementation



Questions?