

First Programming Task

Advanced
Object-oriented
Programming

LVA 185.211
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TU Wien

Catching Mice in a Network Game

Design and implement a network-based game in an object-oriented programming language of your choice (but not in a language or framework specialized for game development). The game shall correspond to the following description.

A rectangular playing field contains several subways (not connected with each other) where mice are safe from being caught by cats staying at the surface. Each subway has several exits to the surface. Mice in subways can move without being seen by cats, and cats can move on the surface without being seen by mice in subways. Cats and mice on the surface see each other, and cats try to catch mice that show up at the surface. Each mouse knows all subways and their exits, but cats see only exits and do not know how they are connected by subways. When a mouse safely enters a subway, it informs other mice in this subway about positions of cats at the time of entering. All mice want to meet in a subway not known by cats. Initially, mice are located in arbitrary subways (except the one where they want to meet) and cats somewhere on the surface. Mice must move to the subway where they want to meet (directly or by using further subways) within a given amount of time, but thereby they have to cover a distance at the surface. Every stay at the surface is risky for mice, the longer the more dangerous. A game ends when all surviving mice arrived the subway where mice meet.

Each player (real person) controls a cat trying to catch as many mice as possible. Mice are controlled by computer algorithms (not necessarily each mouse by the same algorithm). Players use their own computers connected to a network. It must be possible that at least 4 cats (4 players on 4 computers) participate in the same game. The communication between the computers shall be efficient enough to avoid noticeable delays for the largest possible playing field (with reasonable resolution on the available screen size).

Please select appropriate details of the game by yourselves. Give your fancy full scope.

Please answer the following questions based on experiments using your implementation of the game (in the Abgabegespräch):

- Which number and forms of subways, number of exits, number and strategies of mice, playing time, mechanism of controlling cats, etc., provides the most exciting gaming experience? Which variations did you try out?
- Which playing strategy of cats is most promising (cooperation or playing against each other)?