

Faculty of Mathematics and Physics
Charles University in Prague
4th April 2016

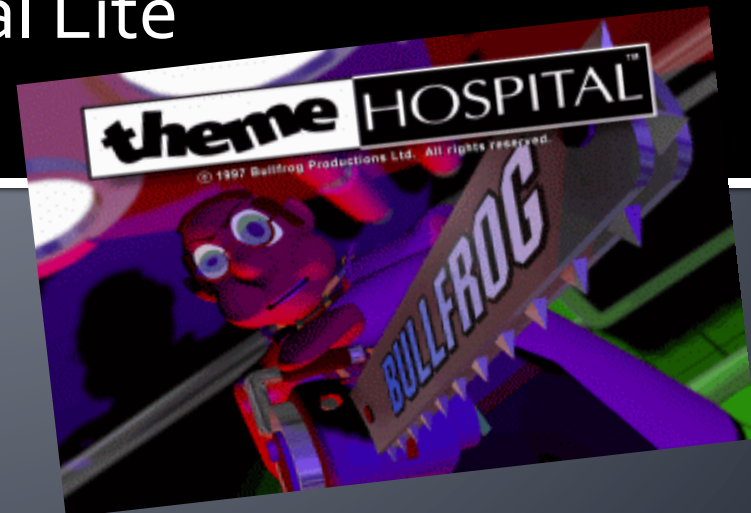


C# Made Easy!

Programming II

Workshop 05 – Theme Hospital Lite

Part 1 – Hospital Map



Workshop 05

Outline



1. Test
2. Topic
 - Theme Hospital Lite
3. Assignment 05
 - Graph + Navigation



Test 05

Warm up!



Find the test here (no-ads):

<https://goo.gl/2eKpPX>

0 vs. 0, i vs. l vs 1

Permanent link:

https://docs.google.com/forms/d/1ls6Gzy9SXJpMfokZepZx9Nzp_gQh0p0TSG1pqn06ohI/viewform

Time for the test:

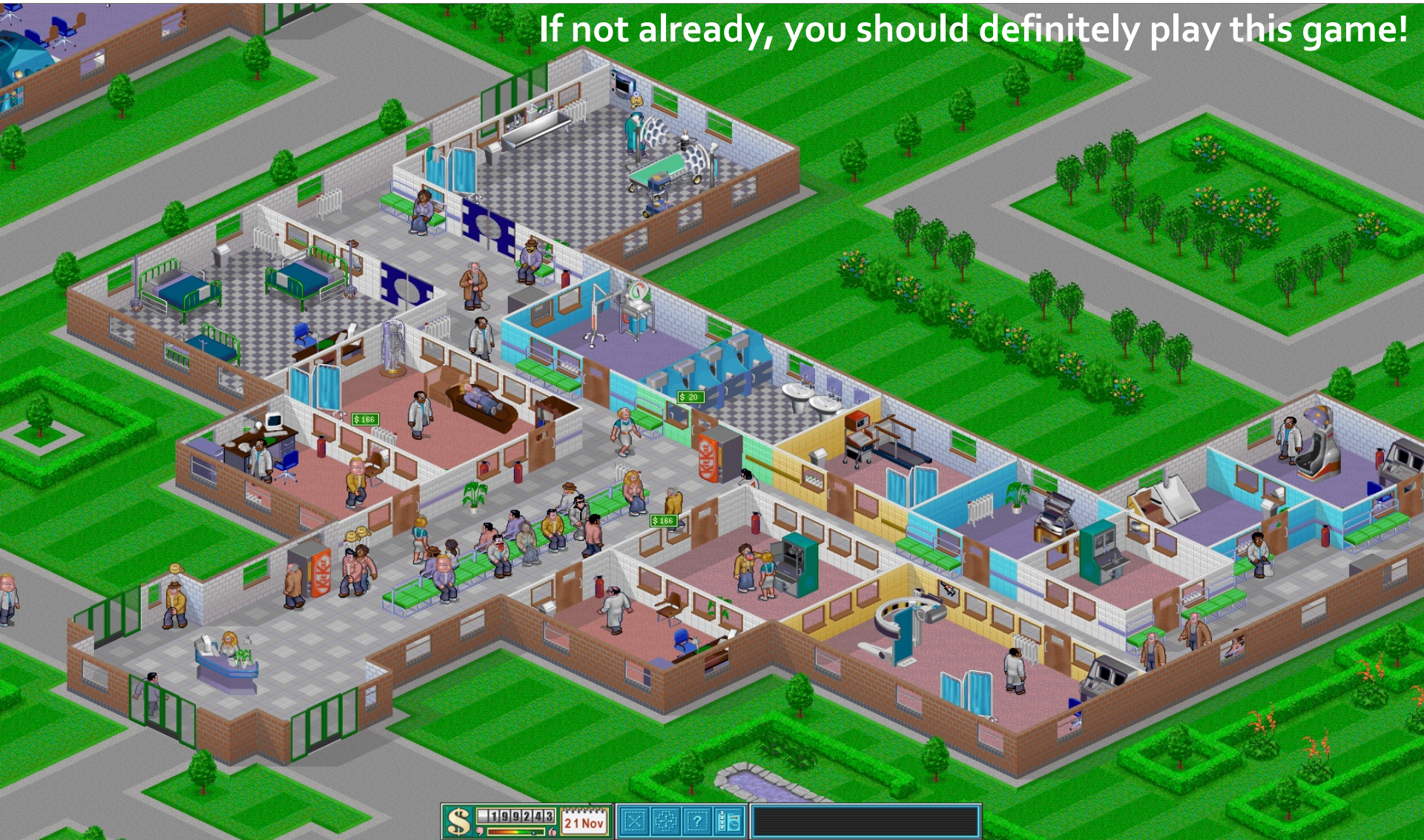
12 min

Topic

Theme Hospital Lite



If not already, you should definitely play this game!



Topic

Theme Hospital Lite



- Rooms / Places
 - Info Desk, GP, EEG, Sono, X-Ray, Psycho, Treatment
- Staff
 - Secretaries, Doctors, Nurses
- Various hospitals
 - Different topologies between rooms
 - Walking / Lift-riding
- Source of income
 - Patients
 - Various age (speed of walking)
 - Various health problems (need special type of diagnoses)
- Our objective
 - Maximize the profits!
 - => Minimize the number of doctors that you need for a given day

Theme Hospital Lite

Navigation



- Oriented graph with costs at edges
- Nodes are “Rooms/Places”
 - ENTRANCE
 - INFODESK
 - GP
 - EEG
 - SONO
 - XRAY
 - PSYCHO
 - TREATMENT
 - NODE
- There can be multiple places of a given type!

Theme Hospital Lite

Navigation



- Oriented graph with costs at edges
- Edges are of two types
 1. Corridors/Stairs
 - Oriented edges
 - Has a base cost in “time” (integer)
 - Cost is modified by person’s `WalkingMultiplier` !
 2. Lifts
 - Non-oriented edges (rides both ways)
 - Always runs between two nodes only
 - Has a maximum capacity
 - Has a base cost in “time” (integer)

Assignment 5

Theme Hospital Lite Navigation



- You will be given a “hospital plan” in the form of the graph
- You will be given a list of “patients”
- And you will be asked to find a “time-shortest” path for a patient “route”
- Your output will be the time needed for a given route based on the patient’s health problem

Assignment 5

Theme Hospital Lite Navigation



INPUT: <int> \n' [<node> ' ' <link> ' ' <node> \n']+ <int> \n' [<patient> \n']+ <int> \n' [<nav-request> \n']+

<node>: <node-type> '-' <id>

<node-type>: ['ENTRANCE' | 'INFODESK' | 'GP' | 'EEG' | 'SONO' | 'XRAY' | 'PSYCHO' | 'TREATMENT' | 'NODE']

<id>: <int>

<int>: [1-9][0-9]{0,1}

<link>: [<walk-link> | <lift-link>]

<walk-link>: [<non-oriented-walk-link> | <oriented-walk-link>]

<non-oriented-walk-link>: '<!--(walk:' <int> ')-->'

<oriented-walk-link>: '<!--(walk:' <cost> ')-->'

<lift-link>: '<!--(lift:c' <capacity> 't'<cost> ')-->'

<cost>: <int>

<capacity>: <int>

Assignment 5

Theme Hospital Lite Navigation



INPUT: <int> '\n' [<node> ' ' <link> ' ' <node> '\n']+ <int> '\n'
[<patient> '\n']+ <int> '\n' [<nav-request> '\n']

<patient>: <name> ':' <speed-multiplier> ':' <health-
problem>

<name>: [A-Z][a-zA-Z]+

<speed-multiplier>: <int>

<health-problem>: ['CARDIAC' | 'PNEUMONIA' | 'HIP-PAIN' |
'NEUROTIC']

<nav-request>: <patient-name> ':' <node>

Assignment 5

Theme Hospital Lite Navigation



Patient route from his "Entrance"

- > Nearest INFODESK
- > Nearest GP
- > Nearest diagnose room for patient's health problem
- > Nearest GP
- > Nearest Treatment
- > Nearest Entrance

Health problems:

- CARDIAC -> EEG
- PNEUMONIA -> XRAY
- HIP-PAIN -> SONO
- NEUROTIC -> PSYCHO

Assignment 5

Theme Hospital Lite Navigation



There is no time associated with “nodes” in this assignment yet... neither any stuff.

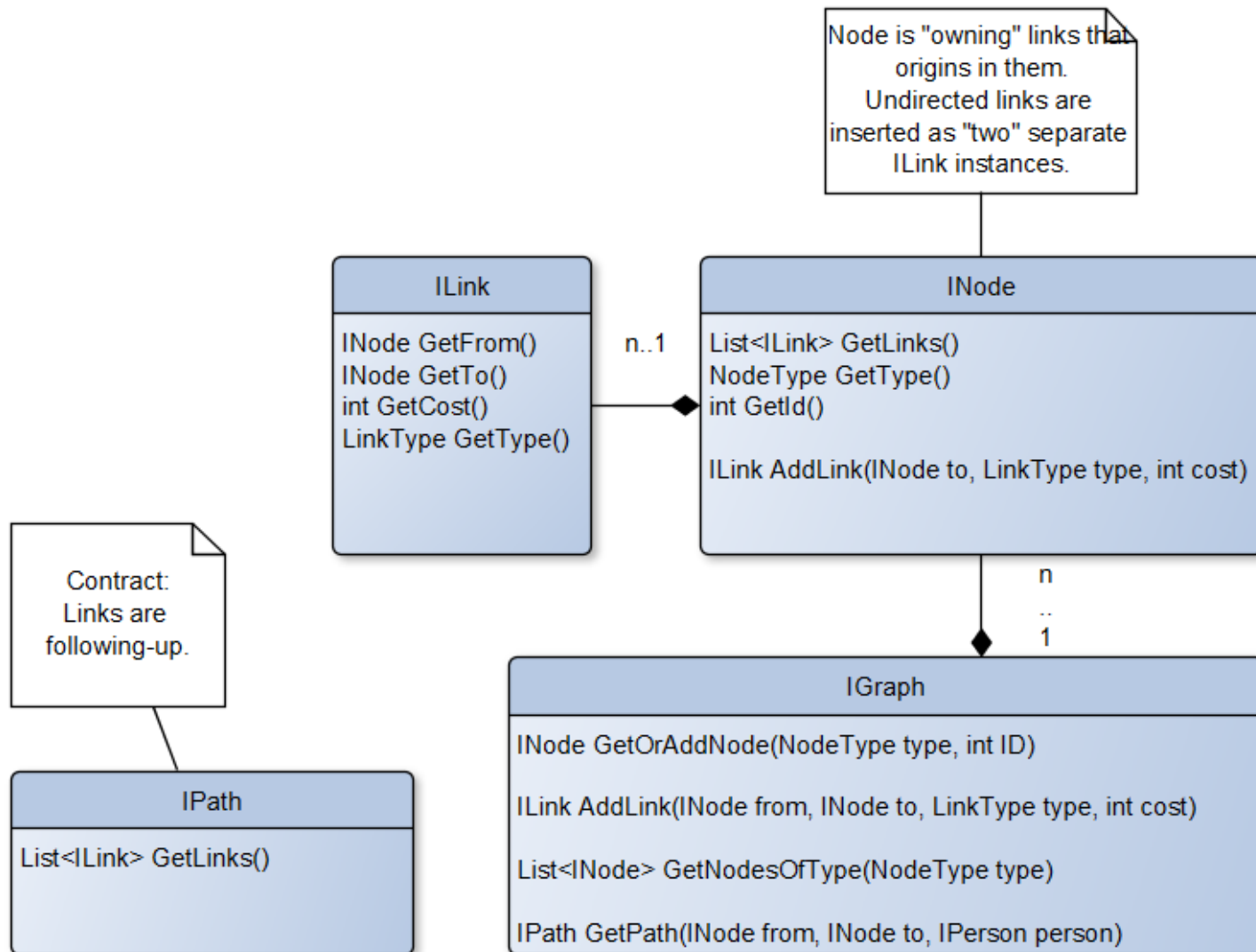
Always treat lifts as “ready to be used at given location”.

Output:

Time (integer number) required to travel through the hospital with respect to the patient’s “speed”. Mind the lifts! Lift riding time is not altered by the patient’s speed at all!

Assignment 5

Theme Hospital Lite Navigation



Assignment 5

CoDex



- Assignment is already in CoDex!
- Watch workshop's website for additional information (example inputs)

Assignment 6 Preview

Theme Hospital Lite



- You will be using your code in Assignment 6 as well! (As you have already guessed...)
- During next workshop, we will be programming a discrete simulation that will use the graph for ETAs
- And it will be further complicated by doctors and lifts ...

Questions?

I sense a soul in search of answers...

- In case of doubts about the assignment or some other problems don't hesitate to contact me!
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