TIE-02408 Programming 3-Techniques Project Assignment

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Game rules and controls:

Game story:

In this game the player is a superhero who has been called to Tampere to stop a rampaging murderer. The murderer has escaped from a secret government facility and was part of a weapons program. He is now moving around the city centre in the buses and killing passengers on them. The player's task is to chase and capture the murderer using the buses (or running) before it's too late. The government cannot give support to the hero, because this catastrophe must remain to secret. Capture the murderer before the public notices and there is a widespread panic.

Game points:

Points keep track of the game situation. Every passenger murdered decreases the points (by 100), but so does every game minute passed (by 10) and the murderer wins if the points go to zero. The points start at 5000. To win the player must capture the murderer by getting their character on top of the murderer character before the points go to zero.

Player control:

The game has two modes of play: single player and multiplayer.

The hero (player 1) is controlled with WASD-keys and can walk around the map freely. To get on a bus the player must be on a stop and when the bus comes, using the key E, the player enters the bus. Exiting buses is possible only on stops and again using the key E.

There is a multiplayer option, where the second player gets to play as the murder. The second player is controlled with IJKL and can enter and exit buses similarly to the first player with the key O. Again, the murderer wins if the points go to zero and the player wins if they capture the murderer.

Keys:

Player 1:

W – Up	A - Left	S-Down	D-Right	E-Enter/Exit Bus

Player 2:

I – Up	J - Left	K-Down	L-Right	O-Enter/Exit Bus

In the start window the game mode (multiplayer or single player) can be chosen. When in single player, a username can be provided for the leader board and the top 10 list is only maintained for single player mode.

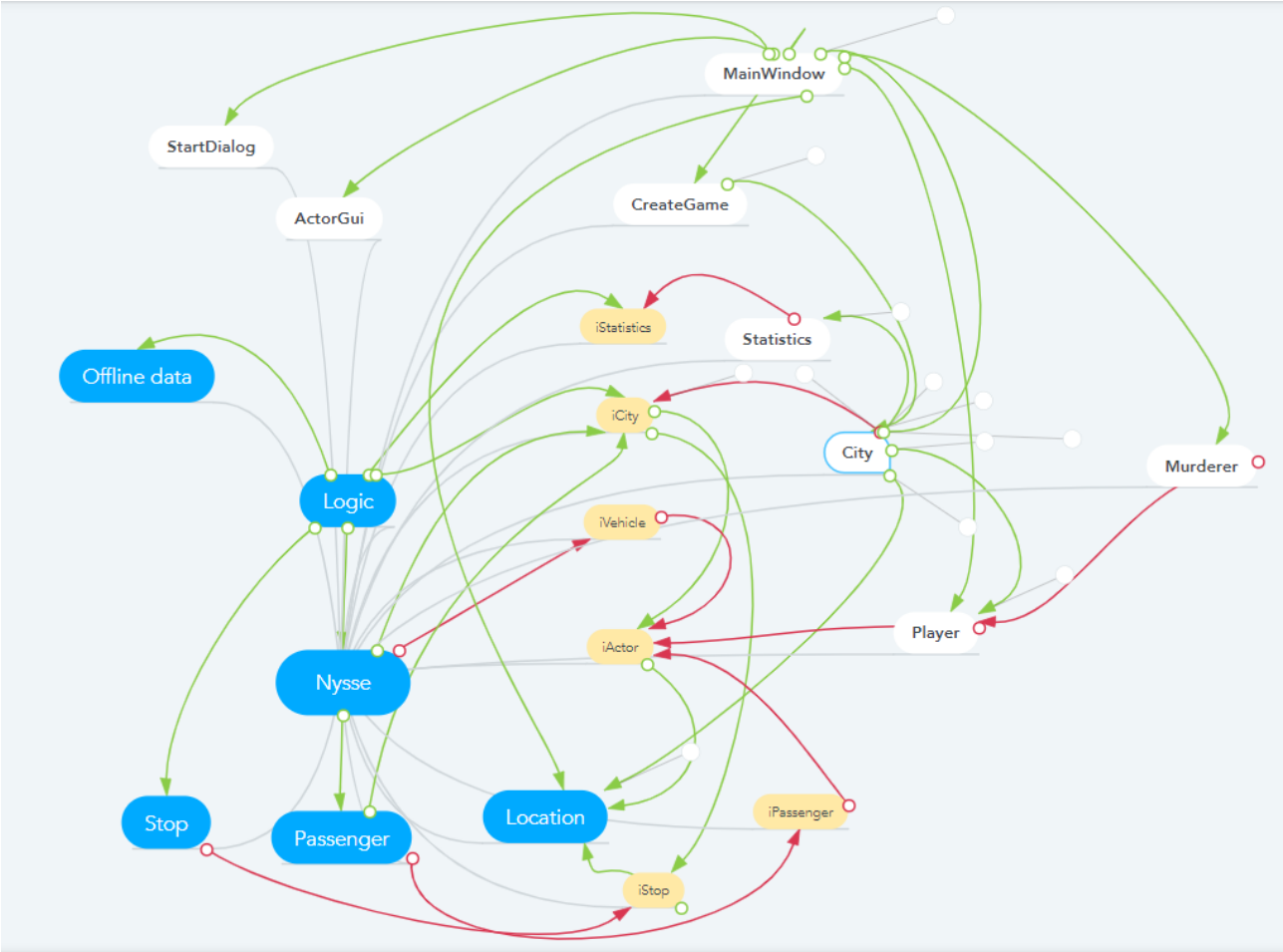
Additional Features implemented:

1. Even screen updates. A timer in the mainwindow updates the screen at even intervals and the mainwindow calls for information updates before drawing.

2. Scrollable map. The game area is the larger city area and scrollable. The window follows player 1 in singleplayer as they move around keeping the player centred on the screen. In multiplayer the map does not follow the players but rather can be moved with the scrolls and the arrow keys.
3. Even movement of the playable figure. The players move evenly with the key controls through the map. Also, the automated murder moves smoothly between stops when walking.
4. Passenger amounts. The amounts of passengers on the buses and the bus stops is shown on the map as numbers on their graphics items.
5. Following the game state. The points and the current time are shown in the gamewindow and are updated throughout the game.
6. Top10-list. There is a top10 single player list that is dependent on the points left as the game ends. This data is saved between games and is visible in the start dialogue.
7. Local multiplayer. There is an option for two players, where the second player plays with the murderer. This can be chosen from the start dialog.
8. Simple AI: In single player mode, the murderer makes choices on which buses to get on, which buses to get off and which directions to walk to, depending on the location of the murderer and the hero by trying to move to the opposite direction of the hero.
9. Buses routes are designed to go even outside the map. In that case, if player is inside a bus that goes outside the map, the player to teleported back to the last stop it was in.
10. Players are notified if they press invalid keys. For example, a player can only get into a bus at a stop. So, if a player tries to get into a bus outside a stop, notification is provided.

Class Diagram:

White boxes represent studentside classes, orange represent interfaces and blue represent courseside classes.



Class functionalities:

The central classes are the city and the gamewindow. The gamewindow naturally handles all graphic objects and the interactions between the user and the game. The city handles the rest of the game functionalities of the game and the connection of the gamewindow to the rest of the game. It provides the gamewindow with the actors that need to be drawn, the stops, the time and the points.

The statistics class keeps track of the points as required. The player class contains the information of the player actor similarly to the passenger class, but also allows movement outside of the stops and buses. The murderer class is derived from the player class and includes functionalities required for automation for singleplayer and murdering. ActorGui are the graphics items for the actors and contain their information. The startDialogue class handles the start dialogue.

In the initialization, the startdialogue is initialized first and then depending on the user inputs, logic, city and gamewindow objects are created and initialized. The city initializes the players and the statistics and gives the information of the actors and the gamebackground to the gamewindow, which then initializes corresponding graphicitems and draws them. Throughout the game, the logic object updates the city with the course side information and the city stores this information and handles its own updates regarding the players. The gamewindow gets the information regarding actors in the city from the city and draws them at even intervals. The gamewindow also takes care of user inputs. Thus, essentially the gamewindow handles player inputted movement information, updating the information directly to the players or in the case of moving between stops and buses through the city, while the city handles automated movement and checks.

Documentation in classes:

The classes city, player and murderer contain pre and post conditions, which are described in the code. There is also doxygen documentation available for the studentside classes.

Work division:

From the start we decided that one of us would make classes related to the graphics and the other would implement the city and players. Thus, Jetro completed the city, statistics and player classes and Sijan completed the gamewindow, actorgui and startdialog. Throughout the project the responsibilities stuck and both of us completed our parts. Only at the debugging phase we made minor changes to each other's' code. Both of us acted as code reviewer for each other's' code. The details of the responsibilities of individual classes did change slightly as we encountered issues and found solutions to them. Also, through close communication we gave each other ideas and tips on how to implement parts and of course also discussed in detail the information that specific classes need from each other especially considering the connections of the city and the gamewindow. Sijan reviewed the programming style implemented to have uniform style in both sections.

Known bugs for further improvements in future:

1. As the game screen update clears the screen and adds all the actors in each time interval, the game lags during play.
2. In multiplayer game, simultaneous key presses from both players sometimes be unresponsive, degrading the quality of gameplay.
3. Stops and buses are more clustered only in particular region and fewer in other regions due to the routes and stop locations provided to us from the courseside.
4. Stops seem to be shifted when plotting in the game area from their original locations due to different coordinate system used by location class. However, it does not degrade the quality of gameplay. It is not matching real Tampere city stops location.
5. There is no automatic following of player in multiplayer mode. This degrades the gameplay quality as everytime a player goes outside gameview, it must be scrolled.