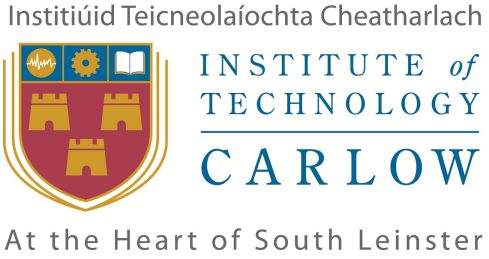

Computer Games Development CW208
Technical Design Document
Year IV

Przemyslaw Tomczyk
C00218004
3rd of May 2020

Institiúid Teicneolaíochta Cheatharlach
INSTITUTE of TECHNOLOGY CARLOW
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Open-Book and Remote Assessment Cover Page

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Module: Final Year Project

Stage/Year: 4th

Date: 03/05/20

Declaration

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Table of Contents

Features

Interactable Grid

Tasks:

1. Create GridTile class to hold and render rectangles
2. Create GridManager to create and hold a grid worth of tiles
3. Add tile types to GridTile
4. Add mouse and keyboard input
5. Make GridTile react to input and change type and colour
6. Add LoadLayout function to load different grid layouts
7. Add more input to alter the grid quickly and easily

A* Algorithm

Tasks:

1. Import previously created A* algorithm
2. Change A* from “offline” to “online” (remove preprocessing from it)
3. Minor optimisation to make A* better

REA* Algorithm

Tasks:

1. Read REA* paper
2. Implement InsertS function.
    a. This will expand a rectangle from start tile’s location
3. Implement Successor function.
    a. This will take the rectangle from InsertS and calculate Free Sub Interval (ENI).
    b. It will then use ENI to calculate Free Sub Intervals (FSI). There will only be one FSI if the entire ENI is unblocked.
    c. For each FSI and each point in FSI, set them up with heuristics.
    d. If at least 1 point was updated in FSI, add it to the priority queue of nodes.
4. Implement Expand function
    a. This will expand a rectangle from Current Best Node (CBN) which is the top item in the priority queue
    b. Set up each border in the expanded rectangle
    c. Call Successor on the expanded rectangle.

CRC Cards

Class Name : **Game**	
Subclasses:	
Superclasses:	
Responsibilities	Collaborators
Create window	
Update loop	
Specify grid layout	
Initialise grid layouts	

Class Name : GridManager	
Subclasses:	
Superclasses:	
Responsibilities	Collaborators
Create grid	GridTile
Setup tiles	BoundaryNode
Process key presses on tiles	SearchNode
Handle both algorithms	

Class Name : **GridTile**	
Subclasses :	
Superclasses :	
Responsibilities	Collaborators
Hold heuristics for algorithms	
Display type of tile	
Hold pointers to previous tile for backtracking	

Class Name : BoundaryNode	
Subclasses :	
Superclasses :	
Responsibilities	Collaborators
Hold index values of tiles in a boundary	SearchNode
Hold ExtendedNeighbourInterval(ENI)	GridTile
Hold temporary FreeSubIntervals (FSI)	
Direction of expansion of parent search node	

Class Name : SearchNode	
Subclasses :	
Superclasses :	
Responsibilities	Collaborators
Used in priority queue to sort and find CurrentBestNode	GridTile
Holds index values of tiles in the interval	
Holds direction of expansion	
Holds smallest heuristic value from the interval	