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Project 4 Report

Function Descriptions

Student World – all functions defined here were done so to access private student world members, such as the Tunnel Man, earth objects, protestors, and others.

Init – places earth and tunnel man in their proper starting points and boulders, oil, and gold in valid random points. Initialize all student world tick counters and probabilities to their correct values for adding protestors, water holes, and sonar kits at the correct times.

Move – allows tunnel man and all other objects to call doSomething and do whatever needs to be done by that object at that time. After all objects have had chance to doSomething, remove any object that is dead from the game. Check to see if there are any barrels left, if there aren’t, go to the next level. Add in any water pool, sonar kit, or protestor that needs to be added. Update any necessary tick counters.

Cleanup – delete all earth object, delete all other objects, delete tunnel man object

Max – returns max of two values

Min – returns min of two values

DisplayScore – puts all needed values in proper format to print out in stat line above the world

RandomSpawnPoints – generates potential x and y value for a goodie or boulder to spawn.

ValidObjectSpawn – returns true if a object can be placed there, false otherwise

DestroyEarth – destroys earth at a certain location

earthExists – returns true if earth is at a certain location, false otherwise

checkOverlap – check if a full size object overlaps with another full sized object

inRadiusOf – returns true if one object is within a given radius of another

checkForEarth – returns true if there is any earth in a upper right 4x4 square above a given point

checkInBounds – returns true is the given index is within the bounds of the world

checkForObject – returns true if it overlaps with a given object

validTunnelManMove – returns true if the tunnel man can move there

validSquirtSpawn – return true if no earth, no boulders are there and is in bounds

sonarScan – reveals all hidden objects that are in the scanner range when activated

addWaterSquirt – adds a water squirt in a given direction

addDroppedGold – add a dropped piece of gold in the field that could be used as a bribe

boulderRoll – moves boulder down, stops if it hits earth, another boulder or tunnel man. if it hits a protestor then the protestor becomes fully annoyed

squirtShot – moves a water squirt and removes if it hits earth, boulder or protestor and hurts protestor if it hits it

pickUpGoodie – decides whether or not to pick up a goodie at a certain place

setGoodieVisible – decides whether or not to make a hidden gold or oil visible

bribeProtestor – decide if a dropped gold nugget should be picked up by a protestor and what they should do after picking it up

incWater – increase tunnelman water

incSonar – increase tunnelMan sonar

incGold – increase tunnelMan gold

optimalMove – uses a queue based breadth first search with coordinate objects that have a direction, x and y data fields to track which direction to move and returns the direction with the shortest path to the exit

shoutAtTunnelMan – return whether or not a protestor shouts at the tunnelman and damage the tunnelman if he does

canSeeTunnelMan – returns a direction that a protestor has a direct line of sight to the tunnel man in or returns direction none

pickNewProtDir – chooses a new random, valid direction for protestor to move in

perpMove – return a direction perpendicular to current direction for protestor to move in if its perpendicular move tick is right

inRangeOfTunnelMan – return true if an object is in a certain radius of tunnel man

onTunnelMan – return true if object shares same location as tunnel man

hardCoreFindTunnelMan – uses same algorithm as optimal move but also maintains a 2d array of integers to check to see if the path is longer that the maximum amount of moves allowed by the hard core protestor, if the path to the tunnel man is less than the maximum length allowed then return the direction to the tunnelman

Actor

doSomething – pure virtual – all descendants must implement this class

isGoodie – virtual – returns false for all classes that don’t redefine (goodies)

isAnnoyed – virtual – returns false for all classes that don’t redefine (persons)

isProtestor – virtual – returns false for all non protestors

getid – returns actor id

getWorld – returns pointer to world that actor resides in

isAlive – returns whether or not actor is alive

die – virtual – makes actor not alive

decHealth – virtual – does nothing if actor is not a person

bribe – virtual – does nothing if actor is not a protestor

annoy – virtual – does nothing if actor is not a person

moveOneCoord – moves actor one square in specified direction

Person – child of actor

doSomething – pure virtual – all descendents (tunnel man and protestors) must implement

annoy – virtual – kills if it’s tunnelman and makes leave map if protestor

die – virtual – plays dying sound for appropriate descendant and kills that actor

decHealth – virtual – decrements health of the person

getHealth – returns the health of person

TunnelMan – child of person

doSomething – virtual – check for escape to end the level, check for squirt gun shot, check for movement, check sonar, check for dropping gold

annoy – virtual – kills the tunnel man

decHealth – virtual – decreases tunnel mans health by a certain amount

incWater – increases water by an amount

incSonar – increases sonar by an amount

incGold – increases gold by an amount

getWater – gets amount of water

getSonar – gets amount of sonar

getGold – gets amount of gold

Protestor – child of person

isProtestor – virtual – returns true

doSomething – virtual – if rest tick is up then complete a move, if he is annoyed then move toward the exit otherwise, check if he should shout at tunnel man, perform move function, check if he is in direct line of sight of the tunnel man and move toward him, otherwise check if he needs a new direction and turn him in that direction or check if he can move in a perpendicular direction and set him in that direction then check if he can move in his next direction and if he can move him there

move – pure virtual – differentiate between regular and hardcore protestor moves

annoy – virtual – make protestor leave the oil field

isAnnoyed – virtual – returns true if he is annoyed

decHealth – virtual – lower protestors health

getTimeBetweenTicks – return time to wait between moves

setRest – set time for protestor to rest between moves

RegularProtestor – child of protestor

Move – virtual – do nothing

Bribe – virtual – annoy protestor and make leave the field

HardCoreProtestor – child of protestor

Move – virtual – move protestor in direction toward tunnel man if he is closer than a certain number of moves away using breadth first search algorithm.

Bribe – virtual – make protestor rest for a certain amount of time before resuming play

WaterSquirt – child of actor

doSomething – virtual – check if can move in current direction or if it wont hit a protestor and continue otherwise remove object and damage protestor if necessary

Boulder – child of actor

doSomething – virtual – check if it can move downward and kill if it cant, annoy protestor if it hits it, kill tunnel man if it hits him

Goodie – child of actor

doSomething – virtual – check if it should be picked up or if it should be revealed if its invisible

if its temporary decrement life tick, if life is 0 then kill it

pickUp – pure virtual – perform what needs to be done to pick up object

isGoodie – virtual – return true

isTemporary – return true if it is a temporary item

getLife – return life span of goodie

decLife – reduce life span by one

OilBarrel – child of Goodie

pickUp – kill the oil barrel

GoldNugget – child of Goodie

pickUp – check if its dropped or not and if a tunnelman or a protestor can pick it up kill it and increment tunnel mans gold count if necessary

SonarKit – child of Goodie

pickUp – kill it and increment tunnel mans sonar count

WaterRefill – child of Goodie

pickUp – kill it and increment tunnel mans water count

Earth – child of Actor

Exists – returns whether or not earth exists at a certain spot

Destroy – kill earth at certain point

doSomething – does nothing

I believe all aspects of my code are fully functional

I wasn’t totally clear on how distance from boulders were to be calculated, and I wasn’t able to test in the sample so I made it so that no part of a boulder could overlap with any other object for normal movement, and that for a falling boulder if any part of the boulder hit part of a person it would count as a bonk. This made sense to me and I believe created clear and understandable gameplay.

Testing

TunnelMan

I walked the tunnel man around the edge of the world to test for boundary cases and that it could properly dig. I then walked it around all sides of a boulder to test it could not walk through. I then collected water refills, gold nuggets and sonars, to test for each’s respective function in the tunnelman class, I also tested the escape key function.

RegularProtestor

I would walk in and out of lines of sight with the protestor to test how its direction would change and walk close to it to test how it would annoy the tunnelman and act when it was close to the tunnel man. I would lure it to walk over a crossing to test its change perpendicular direction function. I would also shoot it to test how it would be stunned. I would drop it gold to test how it would be bribed. I would shoot it enough to kill it to make sure it exits the field in the right way.

HardCoreProtestor

I tested this protestor in almost the same way except I also tested how he would follow the tunnel man when they were close and how every direction he moved in the protestor would follow if he was in the appropriate range.

WaterSquirt

I would shoot the water at walls and boulders and earth to make sure they would not spawn but the tunnelman would still lose one water. I would shoot one in an open tunnel to ensure it would die after 4 squares. I would shoot one a distance less than four away from a wall, boulder, or earth to ensure it died on impact. I would shoot multiple at protestors to make sure they were stunned and annoyed in the correct way, and if they were shot enough, they would exit the oil field.

Boulder

I would try to run into it and shoot it with water to make sure it could not be passed through. I would dig out the earth from under it and make sure it died when it either hit earth or the floor. I would dig out the earth from under it and stand under it to make sure I died. I would lure a protestor under it and dig out the earth and make sure they travelled to the exit.

OilBarrel

I would walk next to one and make sure they would show up when I was next to one and would be picked up when I walked over it. I would use sonars near it to make sure that it would show up from a sonar.

GoldNugget

I would test it the same way as an oil barrel before it was picked up but make sure tunnel mans inventory was updated. Then I would drop one not near any protestor to make sure it disappeared after 100 ticks. This I would drop one near a protestor to see if they would pick it up and how they would behave when they did.

SonarKit

I would walk over the kit and make sure it was picked up and that tunnel man’s inventory was properly updated. I would then let one be to make sure it disappeared after a certain number of ticks. I would test the sonars by walking around the oil field and using them and making sure that all nearby invisible oil barrels and gold nuggets would make themselves visible when used.

WaterRefill

I would walk over the water and make sure it was picked up and that tunnel man’s inventory was properly updated. Then I would let one sit for a while to make sure it disappeared after a certain number of ticks. I would then shoot more water to make sure that the water refill refilled the squirt gun the right amount.

Earth

I made sure the earth was positioned correctly at the start of the game and that when the tunnel man would dig through it, it would be destroyed properly, and that it would stop unauthorized objects from getting through it.

StudentWorld

StudentWorld class was tested through the playing of the game and through the testing of all the other classes.