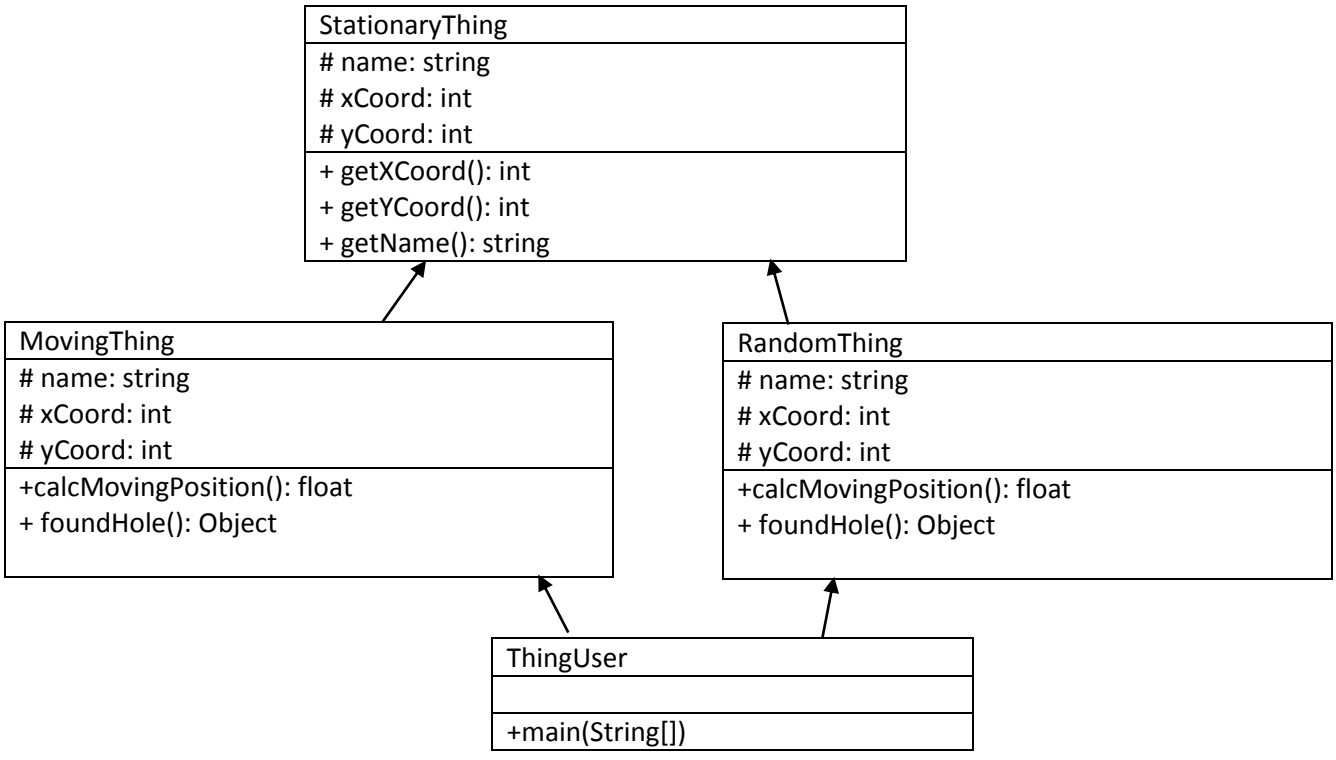
Inheritance

Analysis

Using inheritance, the Thing program will have two "robots" that can detect whether or not a hole is in a square on the grid. One robot will make simple moves and be able to detect the hole if it is directly in front of it while the second robot will be able to detect the hole if it is in any of the surrounding squares. A message will then be outputted saying it has detected the square.

Design

There will be four classes; StationaryThing, RandomThing, MovementThing and ThingUser. ThingUser will read in the position of the hole, which will be checked to see if it is valid. It will also read in the two names of the robots and the number of moves. StationaryThing will be the superclass that returns the values of the coordinates and the robots name. RandomThing will calculate the position of the random moving robot and whether it has found the hole while MovingThing will do the same for the moving robot. All of these calculations will be outputted by the corresponding classes.



Pseudo Code

Public class ThingUser

Main = string args

Create new savings object

Create new scanner

Set Y, X and Moves value

Start DO

Get x value

Start IF

If Not in range state error

End IF

End DO

Set WHILE parameters

Start DO

Get y value

Start IF

If Not in range state error

End IF

End DO

Set WHILE parameters

Get movingThing name

Get randomThing name

Start DO

Get number of moves

Start IF

If less than 0 state error

End IF

End DO

Set WHILE parameters

Create new hole class

Return user values entered

Public class StationaryThing

Create constructor

Method = getXCoord

Return x value

Method = getYCoord

Return y value

Method = getName

Return name

Public class MovingThing extends StationaryThing

Create constructor

Method = calcMovingPosition

Get original position

Move along x axis

Start loop

Start IF

If x = 0 or 9 turn right

End IF

Move along y axis

Start IF

If y = 0 or 9 turn right

End IF

End loop

Method = foundHole

Start IF

If robot y coords+1 = hole coords

Return true

End IF

Start else

Return false

End else

Public class RandomThing

Create constructor

Method = calcRandomPosition

Get original position

Move along x axis

Start loop

Start IF

If x = 0 or 9 turn randomly

End IF

Move along y axis

Start IF

If y = 0 or 9 turn randomly

End IF

End loop

Method = foundHole

Start IF

if newX = xCoord+1 & newY = yCoord+1

or (newX = xCoord+1)&(newY= yCoord))

or ((newX = xCoord+1) &(newY = yCoord-1))

or ((newX = xCoord) & (newY = yCoord+1))

or ((newX = xCoord-1) & (newY= yCoord+1))

or ((newX = xCoord-1) & (newY = yCoord-1))

or ((newX = xCoord-1) &(newY = yCoord))

or ((newX = xCoord) &((newY = yCoord-1))

return true

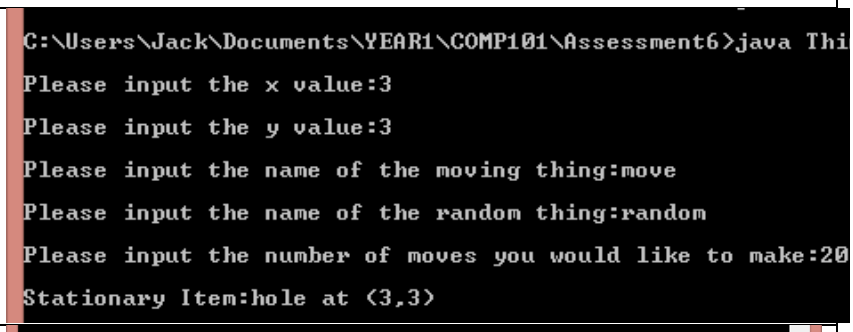
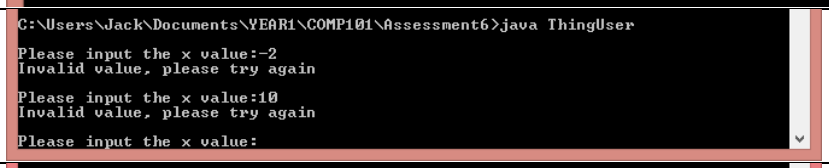
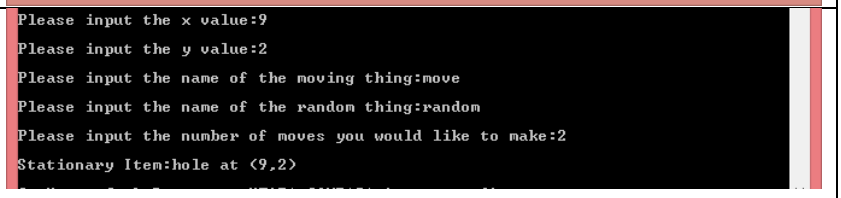
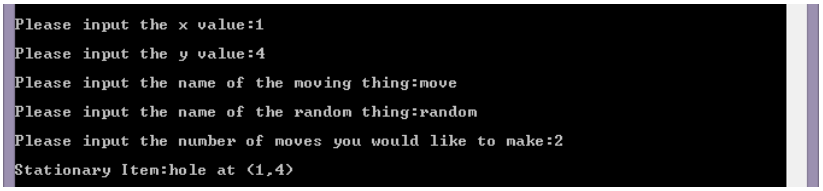
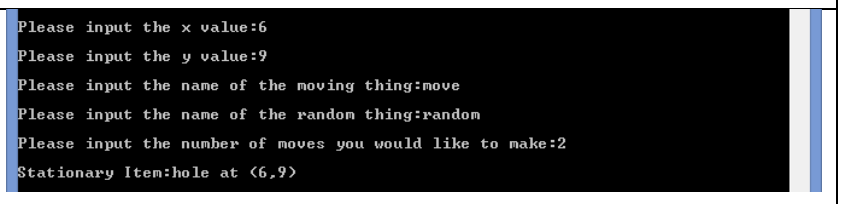
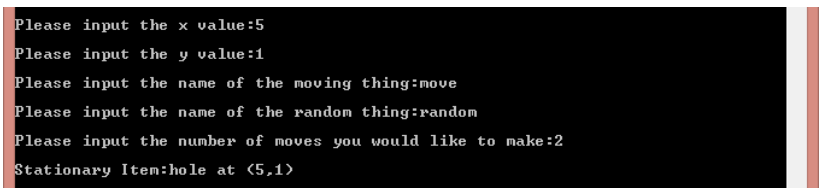
End IF

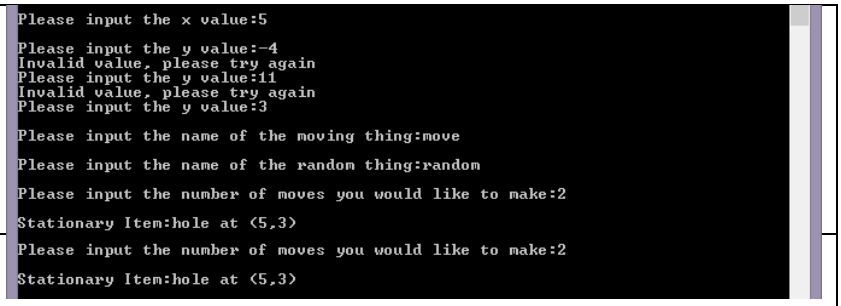
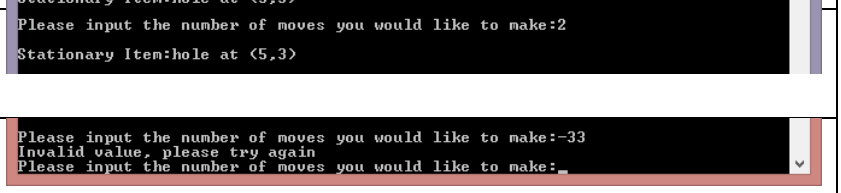
Start ELSE

return false

End Else

Testing

Test	Expected	Actual
Hole location is within the range	No error	
X coordinate of the hole is outside range both ends	Error	
X coordinate on the boundary of range	No error	 
Y coordinate on boundary of range	No error	 

Y coordinate of hole is outside range	Error	
Number of moves is within range	No error	
Number of moves is outside range	Error	