**Name :- Kaustubh Shrikant Kabra**

**CLass:- TE Computer**

**ERP :-38**

**Subject :-LP2(AI) (A Star)**

**Code:-**

from pyamaze import maze,agent,textLabel  
from queue import PriorityQueue  
def h(cell1,cell2):  
 x1,y1=cell1  
 x2,y2=cell2  
  
 return abs(x1-x2) + abs(y1-y2)  
def aStar(m):  
 start=(m.rows,m.cols)  
 g\_score={cell:float('inf') for cell in m.grid}  
 g\_score[start]=0  
 f\_score={cell:float('inf') for cell in m.grid}  
 f\_score[start]=h(start,(1,1))  
  
 open=PriorityQueue()  
 open.put((h(start,(1,1)),h(start,(1,1)),start))  
 aPath={}  
 while not open.empty():  
 currCell=open.get()[2]  
 if currCell==(1,1):  
 break  
 for d in 'ESNW':  
 if m.maze\_map[currCell][d]==True:  
 if d=='E':  
 childCell=(currCell[0],currCell[1]+1)  
 if d=='W':  
 childCell=(currCell[0],currCell[1]-1)  
 if d=='N':  
 childCell=(currCell[0]-1,currCell[1])  
 if d=='S':  
 childCell=(currCell[0]+1,currCell[1])  
  
 temp\_g\_score=g\_score[currCell]+1  
 temp\_f\_score=temp\_g\_score+h(childCell,(1,1))  
  
 if temp\_f\_score < f\_score[childCell]:  
 g\_score[childCell]= temp\_g\_score  
 f\_score[childCell]= temp\_f\_score  
 open.put((temp\_f\_score,h(childCell,(1,1)),childCell))  
 aPath[childCell]=currCell  
 fwdPath={}  
 cell=(1,1)  
 while cell!=start:  
 fwdPath[aPath[cell]]=cell  
 cell=aPath[cell]  
 return fwdPath  
  
if \_\_name\_\_=='\_\_main\_\_':  
 x = int(input("Enter X for X\*X Maze :"))  
 m=maze(x,x)  
 m.CreateMaze()  
 path=aStar(m)  
  
 a=agent(m,footprints=True)  
 m.tracePath({a:path})  
 l=textLabel(m,'A Star Path Length',len(path)+1)  
  
 m.run()

**Output:-**

Enter X for X\*X Maze :7



