

Sandbox | CMU CS Academy

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1 #Maze
2 app.background= 'lightGray'
3 Lines=Group()
4 Rounds=Group()
5 Start=Group(
6     Circle(20,20,20,fill='white'),
7     Label("Start",20,20)
8 )
9 End=Group(
10    Circle(380,380,20,fill='white'),
11    Label('End',380,380)
12 )
13 Predictor=Circle(200,200,2,fill='blue')
14 Current=Circle(20,20,2,fill=gradient('orange','red'))
15 Predictor.count=0
16 Closest=[0,0,600]
17 app.finishFound=False
18 app.mazeFilled=False
19 Lines.lw=20
20 Lines.off=36
21 Veil1=Rect(0,0,400,400,opacity=80,fill=gradient('white','gray','black'))
22 Veil2=Rect(0,0,400,400,opacity=90,fill=gradient('white','gray','black'))
23 playAgain=Group(
24     Rect(150,320,100,40,fill='lightGray',border='gray',borderWidth=5),
25     Label('Play Again',200,340,fill='white',size=15,bold=True)
26 )
27 Win=Group(
28     Veil1,
29     Label('You Win!',200,50,fill='white',border='lightGray',size=60),
30     playAgain
31 )
32 Title=Group(
33     Rect(100,50,200,50,fill='lightGray',border='gray',borderWidth=5),
34     Label("R a n d o M a z e",200,75,fill='white',size=20,bold=True)
35 )
36 Play=Group(
37     Rect(150,150,100,40,fill='lightGray',border='gray',borderWidth=5),
38     Label('Play',200,170,fill='white',size=15,bold=True)
39 )
40 Menu=Group(
41     Veil2,
42     Title,
43     Play
44 )
45 Win.visible=False
46 Current.stage=0
47 Current.dx=0
48 Current.dy=0
49 wait=Label('Generating...',200,200,size=50,visible=False)
50 def generate():
51     if randrange(0,2)==1:
52         #vertical
53         Predictor.centerX=Current.centerX
54         if randrange(0,2)==1:
55             #down
56             Predictor.centerY=Current.centerY+Lines.off
57             if not(Predictor.centerY>400) and Predictor.hitsShape(Lines)==False:
58                 Lines.add(Line(Current.centerX,Current.centerY,Predictor.centerX,
59                               Predictor.centerY,lineWidth=Lines.lw,fill='white'))
60                 Rounds.add(Circle(Predictor.centerX,Predictor.centerY,Lines.lw/2,
61                                 fill='white'))
62                 Current.centerX=Predictor.centerX
63                 Current.centerY=Predictor.centerY
64                 Predictor.count=0
65                 wait.value='Generating.'
66                 wait.left=10
67             else:
68                 Predictor.count+=1
69         else:
70             #up
71             Predictor.centerY=Current.centerY-Lines.off
72             if not(Predictor.centerY<0) and Predictor.hitsShape(Lines)==False:
73                 Lines.add(Line(Current.centerX,Current.centerY,Predictor.centerX,
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74         Predictor.centerY,lineWidth=Lines.lw,fill='white'))
75     Rounds.add(Circle(Predictor.centerX,Predictor.centerY,Lines.lw/2,
76         fill='white'))
77     Current.centerX=Predictor.centerX
78     Current.centerY=Predictor.centerY
79     Predictor.count=0
80     wait.value='Generating...'
81     wait.left=10
82     else:
83         Predictor.count+=1
84 else:
85     #horizontal
86     Predictor.centerY=Current.centerY
87     if randrange(0,2)==1:
88         #right
89         Predictor.centerX=Current.centerX+Lines.off
90         if not(Predictor.centerX>400) and Predictor.hitsShape(Lines)==False:
91             Lines.add(Line(Current.centerX,Current.centerY,Predictor.centerX,
92                 Predictor.centerY,lineWidth=Lines.lw,fill='white'))
93             Rounds.add(Circle(Predictor.centerX,Predictor.centerY,Lines.lw/2,
94                 fill='white'))
95             Current.centerX=Predictor.centerX
96             Current.centerY=Predictor.centerY
97             Predictor.count=0
98             wait.value='Generating..'
99             wait.left=10
100        else:
101            Predictor.count+=1
102        else:
103            #left
104            Predictor.centerX=Current.centerX-Lines.off
105            if not(Predictor.centerX<0) and Predictor.hitsShape(Lines)==False:
106                Lines.add(Line(Current.centerX,Current.centerY,Predictor.centerX,
107                    Predictor.centerY,lineWidth=Lines.lw,fill='white'))
108                Rounds.add(Circle(Predictor.centerX,Predictor.centerY,Lines.lw/2,
109                    fill='white'))
110                Current.centerX=Predictor.centerX
111                Current.centerY=Predictor.centerY
112                Predictor.count=0
113                wait.value='Generating....'
114                wait.left=10
115            else:
116                Predictor.count+=1
117 def onStep():
118     if Veil2.visible==True and playAgain.visible==False and Title.visible==False:
119         wait.visible=True
120     else:
121         wait.visible=False
122     if Current.stage!=0:
123         if Current.stage>=7:
124             Current.centerX+=Current.dx
125             Current.centerY+=Current.dy
126             Current.stage-=1
127     if app.mazeFilled==False or Title.visible==True:
128         Veil2.visible=True
129     else:
130         Veil2.visible=False
131     if distance(Current.centerX,Current.centerY,380,380)<Closest[2]:
132         Closest[0]=Current.centerX
133         Closest[1]=Current.centerY
134         Closest[2]=distance(Current.centerX,Current.centerY,380,380)
135     if not(Current.centerX==380 and Current.centerY==380) and Predictor.count<20:
136         generate()
137     elif Predictor.count>=20 and app.finishFound==False:
138         Current.centerX=Closest[0]
139         Current.centerY=Closest[1]
140         Predictor.count=0
141     elif Predictor.count>=20 and app.finishFound==True and app.mazeFilled==False:
142         mazeFill()
143     elif Current.centerX==380 and Current.centerY==380 and app.mazeFilled==False:
144         app.finishFound=True
145         mazeFill()
146     if Predictor.count>1000 and app.mazeFilled==False:
147         app.mazeFilled=True
148         Current.centerX=20
149         Current.centerY=20

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150     Predictor.centerX=20
151     Predictor.centerY=20
152     Current.radius=7
153     Predictor.visible=False
154     if Current.hitsShape(End)==True and app.mazeFilled==True:
155         Win.visible=True
156 def mazeFill():
157     for line in Lines.children:
158         if line.x2!=380 and line.y2!=380:
159             Current.centerX=line.x2
160             Current.centerY=line.y2
161             generate()
162 def onKeyHold(keys):
163     if app.mazeFilled==True and Menu.visible==False and Current.stage==0:
164         Predictor.centerX=Current.centerX
165         Predictor.centerY=Current.centerY
166         if 'up' in keys:
167             Predictor.centerY-=Lines.off/2
168             if Predictor.centerY>=20 and Predictor.hitsShape(Lines)==True:
169                 #Current.centerY-=Lines.off
170                 animate(1)
171         elif 'down' in keys:
172             Predictor.centerY+=Lines.off/2
173             if Predictor.centerY<=380 and Predictor.hitsShape(Lines)==True:
174                 #Current.centerY+=Lines.off
175                 animate(3)
176         elif 'left' in keys:
177             Predictor.centerX-=Lines.off/2
178             if Predictor.centerX>=20 and Predictor.hitsShape(Lines)==True:
179                 #Current.centerX-=Lines.off
180                 animate(4)
181         elif 'right' in keys:
182             Predictor.centerX+=Lines.off/2
183             if Predictor.centerX<=380 and Predictor.hitsShape(Lines)==True:
184                 #Current.centerX+=Lines.off
185                 animate(2)
186 def onMousePress(mouseX,mouseY):
187     if Play.hits(mouseX,mouseY)==True:
188         Menu.visible=False
189     if playAgain.hits(mouseX,mouseY)==True and playAgain.visible==True:
190         Lines.clear()
191         Rounds.clear()
192         Current.centerX=20
193         Current.centerY=20
194         Predictor.centerX=20
195         Predictor.centerY=20
196         Predictor.visible=True
197         Current.radius=2
198         Predictor.counter=0
199         app.finishFound=False
200         app.mazeFilled=False
201         Closest[2]=600
202         Win.visible=False
203 def animate(dir):
204     Current.stage=12
205     if dir==1:
206         Current.dy=-6
207         Current.dx=0
208     elif dir==2:
209         Current.dx=6
210         Current.dy=0
211     elif dir==3:
212         Current.dy=6
213         Current.dx=0
214     elif dir==4:
215         Current.dx=-6
216         Current.dy=0

```