

Sandbox | CMU CS Academy

```
1 #Car moving with exhaust
2 app.background = 'grey'
3 line1 = Rect(175,400,50,150,fill='yellow')
4
5 cover = Group(Polygon(225,400, 200,200, 400,200, 400,400,fill='grey'),
6               Polygon(175,400, 200,200, 0,200, 0,400,fill='grey'),
7               Rect(0,0,400,200,fill='lightSkyBlue'))
8
9
10 def moveLine(speed1,speed2):
11     line1.height = line1.height ** speed1
12     line1.centerY = line1.centerY ** speed2
13     line1.toBack()
14     if (line1.top >= 400):
15         line1.height = 10
16         line1.bottom = 200
17
18 def masterSmoke(moving):
19     # Animate The Smoke
20     doSmoke(leftSmoke,0,moving)
21     doSmoke(leftSmoke0,0,moving)
22     doSmoke(leftSmoke1,0,moving)
23     doSmoke(leftSmoke2,0,moving)
24     doSmoke(leftSmoke3,0,moving)
25     doSmoke(leftSmoke4,0,moving)
26
27     doSmoke(rightSmoke,1,moving)
28     doSmoke(rightSmoke0,1,moving)
29     doSmoke(rightSmoke1,1,moving)
30     doSmoke(rightSmoke2,1,moving)
31     doSmoke(rightSmoke3,1,moving)
32     doSmoke(rightSmoke4,1,moving)
33
34 def onStep():
35     if (leftBrake.fill == redLit):
36         masterSmoke(0)
37     else:
38         moveLine(1.05,1.005)
39         masterSmoke(1)
40
41 # Car Body
42 Circle(200,172,4)
43 Circle(382,330,16)
44 Circle(346,330,16)
45 Circle(382,225,16)
46 Circle(346,225,16)
47 Line(382,330,346,330,lineWidth=32)
48 Line(382,225,346,225,lineWidth=32)
49 Line(382,330,382,225,lineWidth=32)
50 Line(346,330,346,225,lineWidth=32)
51 Circle(440-200,172,4)
52 Circle(400-382,330,16)
53 Circle(400-346,330,16)
54 Circle(400-382,225,16)
55 Circle(400-346,225,16)
56 Line(400-382,330,400-346,330,lineWidth=32)
57 Line(400-382,225,400-346,225,lineWidth=32)
58 Line(400-382,330,400-382,225,lineWidth=32)
59 Line(400-346,330,400-346,225,lineWidth=32)
60 Polygon(26,320, 20,316, 15,310, 11,303, 9,294, 9,254, 400-9,254, 400-9,294,
61 400-11,303, 400-15,310, 400-20,316, 400-26,320, fill=gradient('whiteSmoke',
62 'whiteSmoke', 'darkGrey', 'white', 'silver', 'silver', 'silver', 'silver',
63 'gainsboro',start='top'))
64 Polygon(26,320, 20,316, 15,310, 11,303, 9,294, 9,254, 400-9,254, 400-9,294,
65 400-11,303, 400-15,310, 400-20,316, 400-26,320, fill=gradient('black', 'white',
66 'white', 'white', 'black',start='left'), opacity=30)
67 Polygon(9,254, 9,213, 11,200, 14,191, 20,185, 81,102, 86,97, 91,94, 100,91,
68 116,89, 162,86, 400-162,86, 400-116,89, 400-100,91, 400-91,94, 400-86,97,
69 400-81,102, 400-20,185, 400-14,191, 400-11,200, 400-9,213, 400-9,254,
70 fill=gradient('darkGray', 'white', 'white', 'white', 'darkGray',start='left'))
71 Polygon(49,152, 82,107, 87,102, 92,100, 97,98, 107,96, 122,95, 200,93,
72 400-122,95, 400-107,96, 400-97,98, 400-92,100, 400-87,102, 400-82,107,
73 400-49,152, fill=gradient(rgb(70,70,90), 'black'))
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74 Line(44,156, 400-44,156, opacity=20)
75 Polygon(25,320, 22,312, 21,305, 22,298, 25,294, 30,289, 400-30,289, 400-25,294,
76 400-22,298, 400-21,305, 400-22,312, 400-25,320, opacity=50)
77 Polygon(200,147, 124,148, 124,155, 119,155, 118,148, 57,149, 57,156, 44,157,
78 40,158, 38,160, 39,147, 44,142, 51,139, 58,138, 150,137, 400-150,137,
79 400-58,138, 400-51,139, 400-44,142, 400-39,147, 400-38,160, 400-40,158,
80 400-44,157, 400-57,156, 400-57,149, 400-118,148, 400-119,155, 400-124,155,
81 400-124,148, fill=gradient('white','grey',start='top'))
82 Line(9,254, 391,254, fill='grey')
83 Line(20,239, 400-20,239, opacity=20)
84 Line(20,239, 9,240, opacity=20)
85 Line(400-20,239, 400-9,240, opacity=20)
86 Line(64,289, 62,254, opacity=20)
87 Line(400-64,289, 400-62,254, opacity=20)
88 Line(22,225, 22,254, opacity=10)
89 Line(400-22,225, 400-22,254, opacity=10)
90 Rect(64,289, 272,31)
91 Rect(12,242,4,10, opacity=60, rotateAngle=-5)
92 Rect(384,242,4,10, opacity=60, rotateAngle=5)
93 Rect(153,180,94,45)
94 Rect(160,187,80,35, fill='whiteSmoke')
95 Label('GVR 1956',200,205, bold=True, size=16, font='monospace',
96 fill='midnightBlue')
97 Rect(160,187,80,8, fill='navy')
98 Label('PENNSYLVANIA',200,191, bold=True, size=7, font='monospace', fill='white')
99 Rect(160,214,80,8, fill='gold')
100 Label('visitPA.com',200,218, bold=True, size=6, font='monospace', fill='black')
101 Rect(160,187,80,35, fill=gradient('black','gainsboro',start='top'),opacity=20)
102 Circle(78,295,16)
103 Circle(82,303,19,fill=gradient('grey','gainsboro','grey',start='right-bottom'))
104 Circle(82,303,14,fill=gradient('grey','white','grey',start='left-bottom'))
105 Circle(76,298,14,fill='black',border=gradient('grey','grey','grey','black',
106 start='left'),borderWidth=1)
107 Circle(400-78,295,16)
108 Circle(400-82,303,19,fill=gradient('grey','gainsboro','grey',start='left-bottom'))
109 Circle(400-82,303,14,fill=gradient('grey','white','grey',start='right-bottom'))
110 Circle(400-76,298,14,fill='black',border=gradient('grey','grey','grey','black',
111 start='left'),borderWidth=1) # End of Car Body
112
113 # Tail-Light Backdrop
114 Polygon(21,225, 22,199, 23,193, 25,189, 27,186, 30,183, 38,181, 53,180,
115 153,180, 153,225)
116 Polygon(400-21,225, 400-22,199, 400-23,193, 400-25,189, 400-27,186, 400-30,183,
117 400-38,181, 400-53,180, 400-153,180, 400-153,225)
118
119 #-----
120 # Setup Variables
121 #app.background = 'lightBlue'
122 app.count = 0
123 app.headLights = 0
124 app.onOff = 0
125 app.onOff0 = 0
126
127 # Colors
128 orangeLit = rgb(225,128,0)
129 orangeOut = rgb(75,43,0)
130 redLit = rgb(225,0,0)
131 redDim = rgb(150,0,0)
132 redOut = rgb(75,0,0)
133 yellowLit = rgb(255,234,131)
134 yellowOut = rgb(120,120,120)
135
136 #-----
137 # Lights
138
139 # Left Side Lights
140 leftTurn = Circle(38, 200, 12, fill=orangeOut)
141 leftRunning = Circle(68, 200, 12, fill=redOut)
142 leftBrake = Circle(98, 200, 12, fill=redOut)
143
144 # Right Side Lights
145 rightTurn = Circle(362, 200, 12, fill=orangeOut)
146 rightRunning = Circle(332, 200, 12, fill=redOut)
147 rightBrake = Circle(302, 200, 12, fill=redOut)
148
149 # Center Brake Light

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150 centerBrakeL = Circle(180, 161, 4, fill=redOut)
151 centerBrakeR = Circle(220, 161, 4, fill=redOut)
152 centerBrake = Line(180, 161, 220, 161, lineWidth=8, fill=redOut)
153
154 # Light Covers
155 # Center Brake Light Cover
156 Line(180, 161, 220, 161, lineWidth=8, fill=rgb(138,41,102), opacity=40)
157 Circle(180, 161, 4, fill=rgb(138,41,102), opacity=40)
158 Circle(220, 161, 4, fill=rgb(138,41,102), opacity=40)
159
160 # Left Lights Cover
161 Polygon(53,180, 153,180, 153,225, 53,225, fill=gradient(rgb(188,91,152),
162 rgb(138,41,102),start='top'), opacity=40)
163 Polygon(21,225, 22,199, 23,193, 25,189, 27,186, 30,183, 38,181, 53,180, 53,225,
164 fill=gradient(rgb(255,164,50),rgb(227,114,0),start='top'), opacity=40)
165
166 # Right Lights Cover
167 Polygon(400-53,180, 400-153,180, 400-153,225, 400-53,225,
168 fill=gradient(rgb(188,91,152),rgb(138,41,102),start='top'), opacity=40)
169 Polygon(400-21,225, 400-22,199, 400-23,193, 400-25,189, 400-27,186,
170 400-30,183, 400-38,181, 400-53,180, 400-53,225, fill=gradient(rgb(255,164,50),
171 rgb(227,114,0),start='top'), opacity=40)
172
173 # Reflectors
174 Rect(54, 218, 55, 4, fill=rgb(180,0,0)) #left
175 Rect(291, 218, 55, 4, fill=rgb(180,0,0)) #right
176
177 # Reverse Lights
178 def reverseLights(status1):
179     Rect(114, 188, 14, 24, fill=status1) #left
180     Rect(271, 188, 14, 24, fill=status1) #right
181 reverseLights(yellowOut) # End of Light Covers
182
183 #-----
184 # Smoke System
185     # Smoke Dots
186 leftSmoke = Circle(76,298,20,fill=rgb(119, 136, 133),opacity=70,visible=False)
187 leftSmoke0 = Circle(76,298,20,fill=rgb(119, 136, 133),opacity=60,visible=False)
188 leftSmoke1 = Circle(76,298,20,fill=rgb(119, 136, 133),opacity=50,visible=False)
189 leftSmoke2 = Circle(76,298,20,fill=rgb(119, 136, 133),opacity=40,visible=False)
190 leftSmoke3 = Circle(76,298,20,fill=rgb(119, 136, 133),opacity=30,visible=False)
191 leftSmoke4 = Circle(76,298,20,fill=rgb(119, 136, 133),opacity=20,visible=False)
192
193 rightSmoke = Circle(324,298,20,fill=rgb(119, 136, 133),opacity=70,visible=False)
194 rightSmoke0 = Circle(324,298,20,fill=rgb(119, 136, 133),opacity=60,visible=False)
195 rightSmoke1 = Circle(324,298,20,fill=rgb(119, 136, 133),opacity=50,visible=False)
196 rightSmoke2 = Circle(324,298,20,fill=rgb(119, 136, 133),opacity=40,visible=False)
197 rightSmoke3 = Circle(324,298,20,fill=rgb(119, 136, 133),opacity=30,visible=False)
198 rightSmoke4 = Circle(324,298,20,fill=rgb(119, 136, 133),opacity=20,visible=False)
199
200 # Smoke Helper Functions
201 def resetSmoke(smokeID,yPos):
202     smokeID.opacity = 60
203     smokeID.centerX = yPos
204     smokeID.centerY = 298
205     smokeID.radius = 20
206
207 def incrementSmoke(smokeID):
208     smokeID.visible = True
209     smokeID.centerX += .75
210     smokeID.centerY -= .25
211
212 def incrementSmokeMoving(smokeID):
213     smokeID.visible = True
214     smokeID.centerX += .25
215     smokeID.centerY += 1.2
216
217 def fadeSmoke(smokeID):
218     smokeID.opacity -= .5
219     smokeID.radius += .25
220
221 # Smoke Function (Using Helper Functions)
222 def doSmoke(numSmoke,rightToggle,movingToggle):
223     if (movingToggle == 0):
224         incrementSmoke(numSmoke)
225     elif (movingToggle == 1):

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226         incrementSmokeMoving(numSmoke)
227     if (numSmoke.opacity == 0):
228         if (rightToggle == 0):
229             resetSmoke(numSmoke,76)
230         elif (rightToggle == 1):
231             resetSmoke(numSmoke,324)
232     else:
233         fadeSmoke(numSmoke)
234
235 #-----
236 # Lights Activation Functions
237 # Car Drive Mode
238 def onKeyPress(key):
239     drive = 'park'
240     # Toggles HeadLights/Running Lights
241     if ('h' == key):
242         if (app.onOff == 0):
243             app.headLights = 1
244             app.onOff = 1
245             leftRunning.fill = redDim
246             rightRunning.fill = redDim
247         else:
248             app.headLights = 0
249             app.onOff = 0
250             leftRunning.fill = redOut
251             rightRunning.fill = redOut
252
253     # Toggles Reverse Lights
254     if ('r' == key):
255         if (app.onOff0 == 0):
256             drive = 'reverse'
257             reverseLights(yellowLit)
258             app.onOff0 = 1
259             if (app.headLights == 1):
260                 leftRunning.fill = redDim
261                 rightRunning.fill = redDim
262             else:
263                 leftRunning.fill = redOut
264                 rightRunning.fill = redOut
265         else:
266             app.onOff0 = 0
267             reverseLights(yellowOut)
268
269 # Car Animation Functnions
270 def onKeyHold(keys):
271     # Animate The Turn Signals, and Brakes
272     # Turn Signals
273     if ('left' in keys) and ('right' not in keys):
274         if (app.count < 10):
275             leftTurn.fill = orangeLit
276             app.count += 1
277         elif (app.count < 19):
278             leftTurn.fill = orangeOut
279             app.count += 1
280         else:
281             app.count = 0
282     if ('right' in keys) and ('left' not in keys):
283         if (app.count < 10):
284             rightTurn.fill = orangeLit
285             app.count += 1
286         elif (app.count < 19):
287             rightTurn.fill = orangeOut
288             app.count += 1
289         else:
290             app.count = 0
291
292     # Hazard Lights
293     if ('right' in keys) and ('left' in keys):
294         if (app.count < 15):
295             rightTurn.fill = orangeLit
296             leftTurn.fill = orangeLit
297             app.count += 1
298         elif (app.count < 30):
299             rightTurn.fill = orangeOut
300             leftTurn.fill = orangeOut
301             app.count += 1

```

```
302         else:
303             app.count = 0
304
305             # Brake Lights
306         if ('down' in keys):
307             leftBrake.fill = redLit
308             leftRunning.fill = redLit
309             rightBrake.fill = redLit
310             rightRunning.fill = redLit
311             centerBrakeL.fill = redLit
312             centerBrakeR.fill = redLit
313             centerBrake.fill = redLit
314
315     # Lights Turn Off Helper
316     def onKeyRelease(keys):
317         # Returns Turn Signals to Off
318         if ('left' in keys):
319             leftTurn.fill = orangeOut
320             app.count = 0
321         if ('right' in keys):
322             rightTurn.fill = orangeOut
323             app.count = 0
324
325         # Returns Brake Lights to Off
326         if ('down' in keys):
327             leftBrake.fill = redOut
328             rightBrake.fill = redOut
329             centerBrakeL.fill = redOut
330             centerBrakeR.fill = redOut
331             centerBrake.fill = redOut
332             if (app.headLights == 1):
333                 leftRunning.fill = redDim
334                 rightRunning.fill = redDim
335         else:
336             leftRunning.fill = redOut
337             rightRunning.fill = redOut
```