ExtraCredit1

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1 ExtraCredit1 - Pedestrian simulation

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Due: Tuesday, April 5th

`Create the two 3-D floor plans for the scenarios of Part 1 and Part 2 of the assignment. Also,`

Part1 Scenario: A crowd or group of people moving through an exit with anobstacle placed in front

Part2 Scenario: Merging crowds during an evacuation

1.1 Add 3-D floor plane with wall and exit for part 1

Create 100 by 100 map plane with exit location at 150, 50

[130]:
```
import numpy as np
from vpython import *

canvas(title='Part 1 Scenario',
     length=500, width=500, height=500,
     center=vector(50,0,50), background=color.white)

#(x,y,z) -> (x,z,y)
floor = box(pos=vector(50,0,50),
       length=100, width=100, height=2,
       color=vec(0.689, 0.933, 1.000))

wall1 = box(pos=vector(0, 5,50),
       length=-1, width=100, height=10)

wall2 = box(pos=vector(50,5,0),
       length=100, width=-1, height=10)

wall3 = box(pos=vector(100,5,50),
       length=-1, width=100, height=10)

wall1 = box(pos=vector(50, 5,100),
       length=100, width=-1, height=10)
```

```
#Exit location at x = 100, y = 0, z= 50 -> (100, 50)
exit_floor = box(pos=vector(97,1.1,50),
       length=6, width=10, height=2,
       color=vec(0.455, 0.819, 0.466))
```

```
<IPython.core.display.HTML object>
```

```
<IPython.core.display.Javascript object>
```

1.1.1 Add spheres(persons) to the plane for part 1

Create 3 persons on different points

1. (5, 1 ,5) -> (x = 5, y = 5)
2. (45, 1 ,5) -> (x = 45, y = 5)
3. (5, 1 ,45) -> (x = 5, y = 45)

[103]:
```
#Return the coordinates for plotting a sphere centered at (x,y,z) -> (x,z,y)
person = []
person.append(sphere(pos=vector(5,1,5), radius=1, color=color.red))
person.append(sphere(pos=vector(45,1,5), radius=1, color=color.red))
person.append(sphere(pos=vector(5,1,45), radius=1, color=color.red))
```

Add Cylinders for obstacles Create 5 obstacles near the exit location on differect points

[105]:
```
person = []
person.append(cylinder(pos=vector(90,0,50), axis=vector(0,5,0), radius=3,␣
 ↪color=color.blue))
person.append(cylinder(pos=vector(80,0,40), axis=vector(0,5,0), radius=3,␣
 ↪color=color.blue))
person.append(cylinder(pos=vector(70,0,30), axis=vector(0,5,0), radius=3,␣
 ↪color=color.blue))
person.append(cylinder(pos=vector(60,0,20), axis=vector(0,5,0), radius=3,␣
 ↪color=color.blue))
person.append(cylinder(pos=vector(50,0,10), axis=vector(0,5,0), radius=3,␣
 ↪color=color.blue))
```

1.2 Add 3-D floor plane with T-shaped wall and exit for part 2

[128]:
```
import numpy as np
from vpython import *

canvas(title='Part 1 Scenario',
     length=500, width=500, height=500,
     center=vector(50,0,50), background=color.white)

#(x,y,z) -> (x,z,y)
floor = box(pos=vector(50,0,50),
```

```
       length=100, width=100, height=2,
       color=vec(0.689, 0.933, 1.000))

wall1 = box(pos=vector(50, 5,50),
       length=-1, width=100, height=10)

wall2 = box(pos=vector(70, 5,20),
       length=-1, width=40, height=10)

wall3 = box(pos=vector(70, 5,80),
       length=-1, width=40, height=10)

wall4 = box(pos=vector(60, 5,100),
       length=20, width=-1, height=10)

wall5 = box(pos=vector(60, 5,0),
       length=20, width=-1, height=10)

wall6 = box(pos=vector(85, 5,60),
       length=30, width=-1, height=10)

wall7 = box(pos=vector(85, 5,40),
       length=30, width=-1, height=10)


#Exit location at x = 100, y = 0, z= 50 -> (100, 50)
exit_floor = box(pos=vector(97,1.1,50),
       length=6, width=10, height=2,
       color=vec(0.455, 0.819, 0.466))
```

```
<IPython.core.display.HTML object>
```

```
<IPython.core.display.Javascript object>
```

1.2.1 Add spheres(persons) to the plane for part 2

Create 10 persons on different points in the corridors.

[129]:
```
persons = [vector(60,1,95), vector(52,1,95), vector(54,1,95), vector(58,1,95),␣
 ↪vector(64,1,95),
         vector(60,1,5), vector(52,1,5), vector(54,1,5), vector(58,1,5),␣
 ↪vector(64,1,5)]
for person in persons:
    sphere(pos=person, radius=1, color=color.red)
```

[ ]:
```

```