

Random numbers

- see the `random` module for details and extent of creating random numbers

Random numbers

- the method `random.randint` can be used to generate random integers
- any easy example usage is:

```
#!/usr/bin/env python  
  
import random  
  
print "your die roll was", random.randint (1, 7)
```

Sounds

- ```
#!/usr/bin/env python

sound = pygame.mixer.Sound ("mysound.wav")
sound.play ()
```
- please see the [pygame](https://www.pygame.org/docs/ref/mixer.html) web site for more detail

## Adding Cities to your game

- the tutorial asked you to add cities and guns to your program

```
class city:
 def __init__ (self, pos):
 self._pos = pos
 self._epicenter = [pos[0] + city_length/2, pos[1]-city_height]
 self._exploding = False
 self._explosion = None
 self.draw_city ()
```

## Adding Cities to your game

```
def draw_city (self):
 pygame.draw.rect (screen, wood_light, (self._pos[0], self._pos[1], city_length,
def update (self):
 pass
def ignite (self, p):
 return self._exploding
def erase (self):
 pygame.draw.rect (screen, black, (self._pos[0], self._pos[1], city_length, city
```

## Adding Cities to your game

```
def check (self, p, radius):
 if (not self._exploding) and $\text{sqr}(\text{radius}) > \text{sqr}(\text{p}[0] - \text{self}._\text{epicenter}[0]) + \text{sqr}(\text{p}[1] - \text{self}._\text{epicenter}[1])$:
 self._exploding = True
 createExplosion (p, grey)
 createExplosion (self._epicenter, light_grey)
 globalRemove (self)
```

## Using cities in your code

```
city_list = []
city_length = 90
city_height = 25
attack_number = 5
rate_of_attack = 400

def make_cities ():
 global city_list

 for p in [[100, 768-city_height], [200, 768-city_height], [300, 768-city_height],
 [600, 768-city_height], [700, 768-city_height], [800, 768-city_height]]:
 c = city (p)
 city_list += [c]
```

## Using cities in your code

```
def check_cities_guns (pos, radius):
 for c in city_list:
 c.check (pos, radius)
```



## Using cities in your code

```
def spawn_attack ():
 global attack_number
 if attack_number > 0:
 if random.randint (1, rate_of_attack) == 1:
 attack_number -= 1
 c = city_list [random.randint (0, 5)]
 createMissile ([random.randint (1, 1000), 0],
 c._epicenter)
```

## Using cities in your code

```
def no_of_cities ():
 n = 0
 for c in city_list:
 if not c._exploding:
 n += 1
 return n
```

## Using cities in your code

```
def check_finished ():
 if attack_number == 0 and len (allObjects) == 0:
 n = no_of_cities ()
 if n == 0:
 print "you lost!"
 elif n == 1:
 print "you survived with 1 city left"
 else:
 print "you survived with", n, "cities left"
 sys.exit (0)
```

## Using cities in your code

```
def main ():
 global screen
 pygame.init ()
 screen = pygame.display.set_mode ([width, height])
 make_cities ()
 wait_for_event ()
```

# Guns

- guns in missile command are rather similar to cities
- we need another class, with similar methods
  - it might be possible to inherit code - but that is left for another day

```
ammo_per_silo = 20
gun_length = 90
gun_height = 25
gun_list = []
```

# Guns

```
class gun:
 def __init__ (self, pos):
 global screen
 self._ammo = ammo_per_silo
 self._pos = pos
 self._epicenter = [pos[0] + gun_length/2, pos[1]-gun_height]
 self._exploding = False
 self._explosion = None
 self.draw_gun ()
```

# Guns

```
def draw_gun (self):
 global screen
 print "rect", self._pos, gun_length, gun_height
 pygame.draw.rect (screen, dark_blue, (self._pos[0], self._pos[1], gun_length, g
def fire (self):
 if self._ammo > 0 and (not self._exploding):
 self._ammo -= 1
 createMissile (self._epicenter, pygame.mouse.get_pos ())
```

# Guns

```
def update (self):
 pass
def ignite (self, p):
 return self._exploding
def erase (self):
 pygame.draw.rect (screen, black, (self._pos[0], self._pos[1], gun_length, gun_h
def check (self, p, radius):
 if (not self._exploding) and sqr (radius) > sqr (p[0]- self._epicenter[0]) + sq
 self._exploding = True
 createExplosion (p, grey)
 createExplosion (self._epicenter, light_grey)
 globalRemove (self)
```



## Linking up guns to the game

```
def check_cities_guns (pos, radius):
 for c in city_list:
 c.check (pos, radius)
 for g in gun_list:
 g.check (pos, radius)
```

## Linking up guns to the game

```
def spawn_attack ():
 global attack_number
 if attack_number > 0:
 if random.randint (1, rate_of_attack) == 1:
 attack_number -= 1
 c = city_list [random.randint (0, 5)]
 createMissile ([random.randint (1, 1000), 0],
 c._epicenter)
```

## Linking up guns to the game

```
if random.randint (1, rate_of_attack) == 1:
 attack_number -= 1
 g = gun_list [random.randint (0, 2)]
 createMissile ([random.randint (1, 1000), 0],
 g._epicenter)
```

## Linking up guns to the game

```
def make_guns ():
 global gun_list
 for p in silos:
 g = gun (p)
 gun_list += [g]
```

## Linking up guns to the game

```
def main ():
 global screen
 pygame.init ()
 screen = pygame.display.set_mode ([width, height])
 make_cities ()
 make_guns ()
 wait_for_event ()
```

## Tutorial

- add this code to your game
- comment the code
- observe the similarity between guns and cities
- add scoring, sounds and features