

## Tutorial: Missile help

■ `#!/usr/bin/env python`

```
import pygame, sys, time, random, bres
from pygame.locals import *
```

```
wood_light = (166, 124, 54)
wood_dark = (76, 47, 0)
blue = (0, 100, 255)
dark_red = (166, 25, 50)
dark_green = (25, 100, 50)
dark_blue = (25, 50, 150)
black = (0, 0, 0)
white = (255, 255, 255)
yellow = (240, 230, 140)
grey = (153, 153, 153)
```

```
width, height = 1024, 768
screen = None
```

```
maxRadius = 60
allObjects = []
delay = 15    # number of milliseconds delay before generating a USEREVENT
missileSize = 3
```

```
silos = [[80, 700], [500, 700], [1000, 700]]
```

```
def sqr (x):  
    return x*x
```

```
class explosion:
```

```
    def __init__ (self, pos, colour):
```

```
        self._radius = 1
```

```
        self._maxRadius = maxRadius
```

```
        self._increasing = True
```

```
        self._pos = pos
```

```
        self._colour = colour
```

```
    def update (self):
```

```
        if self._increasing:
```

```
            pygame.draw.circle (screen, self._colour, self._pos, self._radius, 0)
```

```
            self._radius += 1
```

```
            if self._radius == self._maxRadius:
```

```
                self._increasing = False
```

```
        else:
```

```
            pygame.draw.circle (screen, black, self._pos, self._radius, 0)
```

```
            self._radius -= 1
```

```
            if self._radius > 0:
```

```
                pygame.draw.circle (screen, self._colour, self._pos, self._radius, 0)
```

```
            else:
```

```
                globalRemove (self)
```

```
    def erase (self):
```

```
        pygame.draw.circle (screen, black, self._pos, self._radius, 0)
```

```
    def ignite (self, p):
```

```
        return sqr (self._pos[0]-p[0]) + sqr (self._pos[1]-p[1]) < sqr (self._radius)
```

```
def drawTrail (p):
```

```
    pygame.draw.rect (screen, white, (p[0], p[1], missileSize, missileSize), 0)
```

```

def drawMissile (p):
    pygame.draw.rect (screen, yellow, (p[0], p[1], missileSize, missileSize), 0)

def eraseBlock (p):
    pygame.draw.rect (screen, black, (p[0], p[1], missileSize, missileSize), 0)

class missile:
    def __init__ (self, start_pos, end_pos):
        self.route = bres.bres (start_pos, end_pos)
        self.erase_route = bres.bres (start_pos, end_pos)
    def update (self):
        if self.route.finished ():
            globalRemove (self)
            createExplosion (self.route.get_current_pos (), white)
        elif ignites (self.route.get_current_pos ()):
            createExplosion (self.route.get_current_pos (), grey)
        drawTrail (self.route.get_current_pos ())
        drawMissile (self.route.get_next ())
    def erase (self):
        while not self.erase_route.finished ():
            eraseBlock (self.erase_route.get_next ())
    def ignite (self, p):
        return False

def ignites (p):
    for o in allObjects:
        if o.ignite (p):
            return True
    return False

def createMissile (start_pos, end_pos):

```

```

        global allObjects
        allObjects += [missile (start_pos, end_pos)]
        pygame.time.set_timer (USEREVENT+1, delay)

def createExplosion (pos, colour):
    global allObjects
    allObjects += [explosion (pos, colour)]
    pygame.time.set_timer (USEREVENT+1, delay)

def globalRemove (e):
    global allObjects
    e.erase ()
    allObjects.remove (e)
    pygame.display.flip ()

def updateAll ():
    if allObjects != []:
        for e in allObjects:
            e.update ()
    if allObjects != []:
        pygame.display.flip ()
        pygame.time.set_timer (USEREVENT+1, delay)

def wait_for_event ():
    global screen
    while True:
        event = pygame.event.wait ()
        if event.type == pygame.QUIT:
            sys.exit(0)
        if event.type == KEYDOWN and event.key == K_ESCAPE:
            sys.exit (0)

```

```
    if event.type == pygame.MOUSEBUTTONDOWN:
        if event.button >= 1 and event.button <= 3:
            createMissile (silos[event.button-1], pygame.mouse.get_pos ())
if event.type == USEREVENT+1:
    updateAll ()
```

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

main ()
```

## Tutorial

- extend your missile command program to include a `city` class
- give your city class an `__init__`, `update`, `ignite`, `erase` and `check` method
- the method prototypes are:

# Tutorial

```
# create a city at pos
# calculate the epicenter of the city
# store it in the class
def __init__ (self, pos):
    # draw the city
    def draw_city (self):
        # remove the city
    def erase (self):
        # determine whether city should catch fire given explosion at p with a radius
    def check (self, p, radius):
```

■ extend your game to include cities and their destruction!

■ now create a gun class (which will be very similar to the city class)