

**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 genera
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):

        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_ESCAP:
            sys.exit (0)
        if event.type == pygame.MOUSEBUTTONDOWN:
            if event.button >= 1 and event.button <= 3:
                createMissile (silos[event.button-1], pyg
        if event.type == USEREVENT+1:
            updateAll ()

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

```
if self._increasing:
    pygame.draw.circle (screen, self._colour, self._pos,
        self._radius += 1
    if self._radius == self._maxRadius:
        self._increasing = False
else:
    pygame.draw.circle (screen, black, self._pos,
        self._radius -= 1
    if self._radius > 0:
        pygame.draw.circle (screen, self._colour,
            else:
                globalRemove (self)
def erase (self):
    pygame.draw.circle (screen, black, self._pos, self._radius)
def ignite (self, p):
    return sqr (self._pos[0]-p[0]) + sqr (self._pos[1]-p[1])

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

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

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

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 ())
        elif ignites (self.route.get_current_pos ()):
            createExplosion (self.route.get_current_pos ())
            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
```

```
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 expo
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)