

Connectivity

April 28, 2019

```
In [18]: class pixel:
```

```
    def __init__(self,x,y):
        self.x = x
        self.y = y
```

```
In [23]: def four_way_check(p1,p2):
```

```
    x1,y1 = p1.x,p1.y
    x2,y2 = p2.x,p2.y

    if x2==x1:
        if y2-1==y1:
            return True
        elif y2+1==y1:
            return True
    elif y2==y1:
        if x2-1==x1:
            return True
        elif x2+1==x1:
            return True
    else:
        return False
```

```
In [29]: def four_way(p1):
```

```
    x1,y1 = p1.x,p1.y
    neig_four = [(x1-1,y1),(x1+1,y1),(x1,y1-1),(x1,y1+1)]

    return neig_four
```

```
In [31]: def d_way(p1):
```

```
    x1,y1 = p1.x,p1.y
    neig_d = [(x1-1,y1-1),(x1-1,y1+1),(x1+1,y1-1),(x1+1,y1+1)]
    return neig_d
```

```
In [33]: def eight_way(p1):
```

```
    x1,y1 = p1.x,p1.y
```

```

        eight = [(x1-1,y1-1),(x1-1,y1),(x1-1,y1+1),(x1,y1-1),(x1,y1+1),(x1+1,y1-1),(x1+1,y1+1)]
        return eight

```

```

In [38]: print(four_way(p2))

```

```

[(0, 0), (2, 0), (1, -1), (1, 1)]

```

```

In [39]: print(d_way(p2))

```

```

[(0, -1), (0, 1), (2, -1), (2, 1)]

```

```

In [40]: print(eight_way(p2))

```

```

[(0, -1), (0, 0), (0, 1), (1, -1), (1, 1), (2, -1), (2, 0), (2, 1)]

```

```

In [21]: p1 = pixel(0,0)
        p2 = pixel(1,0)

```

```

        print(four_way(p1))

```

```

True

```

```

In [7]: p3 = pixel(1,1)
        print(four_way(p1,p3))

```

```

False

```

```

In [24]: def d_way_check(p1,p2):

```

```

    x1,y1 = p1.x,p1.y
    x2,y2 = p2.x,p2.y

    if x2-1==x1 and y2-1==y1:
        return True
    elif x2-1==x1 and y2+1==y1:
        return True
    elif x2+1==x1 and y2-1==y1:
        return True
    elif x2+1==x1 and y2+1==y1:
        return True
    else:
        return False

```

```

In [9]: d_way(p1,p2)

```

```
Out[9]: False
```

```
In [10]: d_way(p1,p3)
```

```
Out[10]: True
```

```
In [25]: def eight_way_check(p1,p2):
```

```
    x1,y1 = p1.x,p1.y
```

```
    x2,y2 = p2.x,p2.y
```

```
    eight = [(x1-1,y1-1),(x1-1,y1),(x1-1,y1+1),(x1,y1-1),(x1,y1+1),(x1+1,y1-1),(x1+1,y1+1)]
```

```
    if (x2,y2) in eight:
```

```
        return True
```

```
    else:
```

```
        return False
```

```
In [12]: eight_way(p1,p2)
```

```
Out[12]: True
```

```
In [13]: p4 = pixel(2,3)
```

```
In [14]: eight_way(p1,p4)
```

```
Out[14]: False
```

```
In [26]: def m_way_check(p1,p2):
```

```
    x1,y1 = p1.x,p1.y
```

```
    x2,y2 = p2.x,p2.y
```

```
    eight = [(x1-1,y1-1),(x1-1,y1),(x1-1,y1+1),(x1,y1-1),(x1,y1+1),(x1+1,y1-1),(x1+1,y1+1)]
```

```
    if (x2,y2) in eight:
```

```
        return True
```

```
    else:
```

```
        return False
```

```
In [16]: m_way(p1,p2)
```

```
Out[16]: True
```

```
In [17]: m_way(p1,p4)
```

```
Out[17]: False
```

```
In [ ]:
```