

Are zombies following the navigation grid?

- We didn't quite get the gridwalker zombie following the navgrid last week.
- Finish this off as a starter.
- If you need them, you can get the slides from last week here and work through adding them in:

`github.com/JamesAdey/zompy/blob/master/slides/cc_week4.pdf`

- Afterwards, download the slides for this week from here:

`github.com/JamesAdey/zompy/blob/master/slides/cc_week5.pdf`

Creative Computing.

Week 5

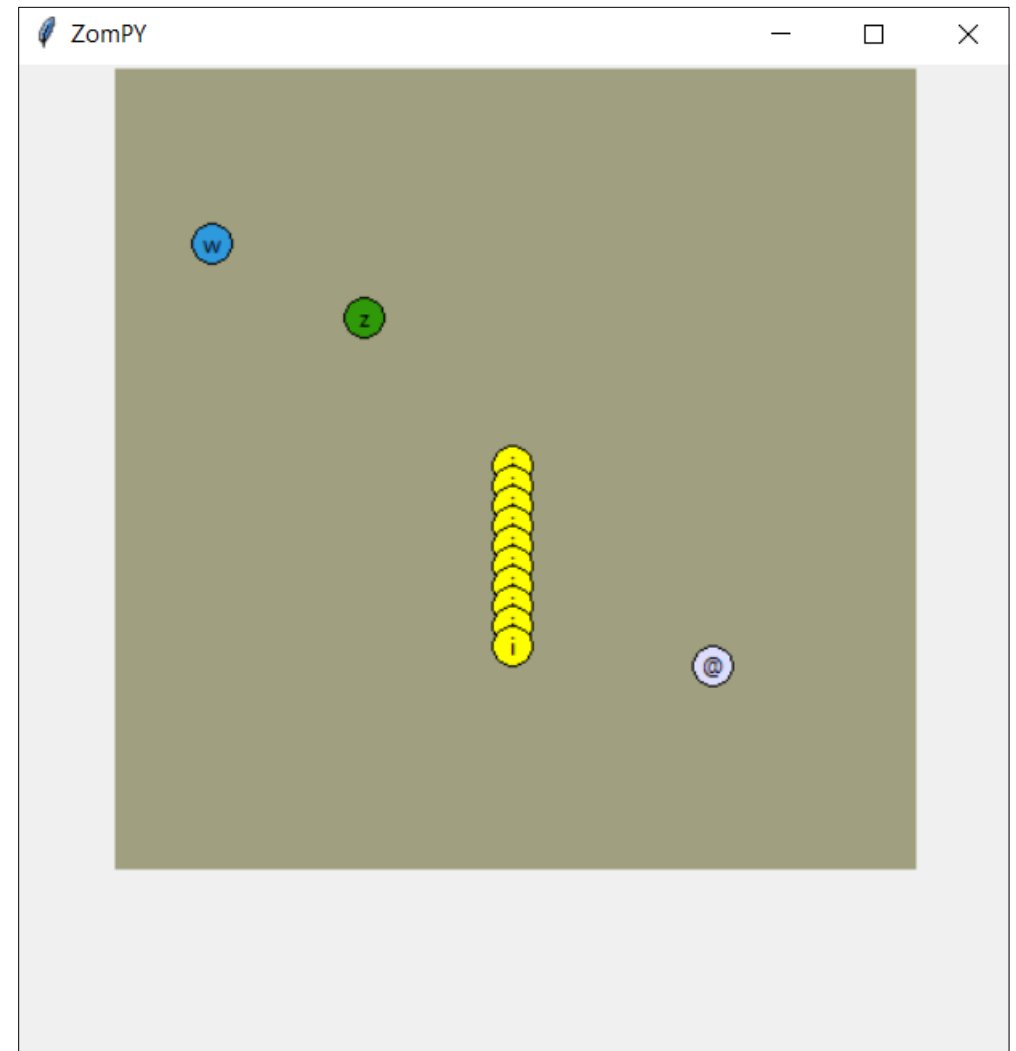
(cool stuff + computers = ?)

If you don't have the project yet...

- I've hosted the basic code on my GitHub
- Go to: ***github.com/jamesadey/zompy/tree/week5***
 - *This is the project containing finished code from week 4, ready for week 5.*
- Download all the files
 - *There should be a button to **download/clone***
- Open zompy_launcher.py in IDLE
 - Python version 3.x please!
- Run this file, and the game should start...

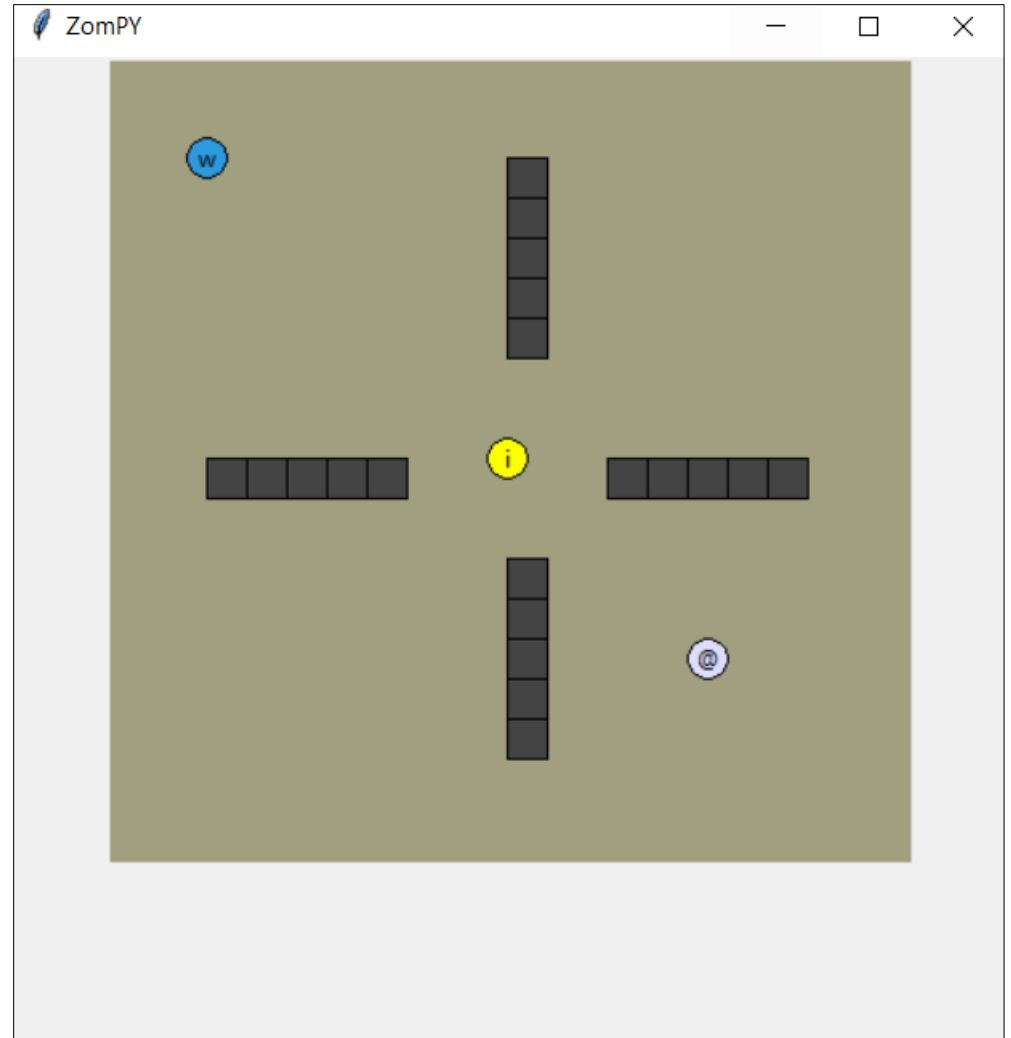
Where next?

- Our zombies can move... intelligently!
- And they can be shot...
- We have spawners...
- And item pickups!



Levels!

- Our zombies can move... intelligently!
- And they can be shot...
- We have spawners...
- And item pickups!
- Now it's time for some walls!



Random maps.

(and bugfixes!)

A more practical session...

- Less theory today, more practical programming!
We'll split the lesson into two parts.
- Part 1: Map generation
 - Adding in the map generator, and moving game setup to a level based system.
- Part 2: Bugfixes!
 - Fixing a bug with the player radius being zero

Map Generator

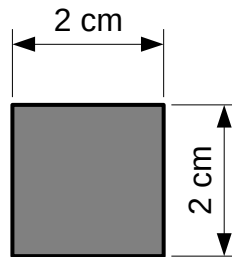
- This is a module, instead of a class.
- It contains helpful functions to use when creating a level.
- *create_random_rocks(gameEngine,width,height,numwalls)*
 - This function places random rocks/walls around the box specified by width and height
- *create_rock_wall(gameEngine,startX,startY,endX,endY)*
 - This function creates lines of rocks/walls from (startX,startY) to (endX,endY)

Creating lines of walls.

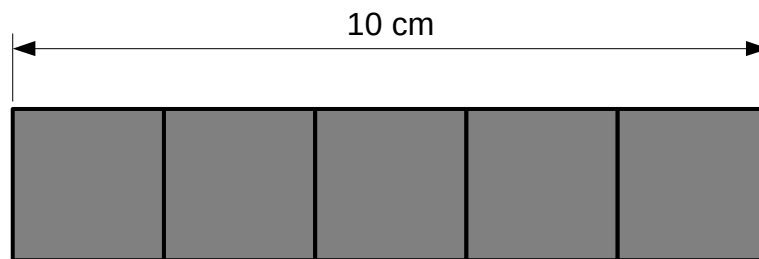
Algorithm to create lines of walls

Inputs: *wallSize, startX, startY, endX, endY*

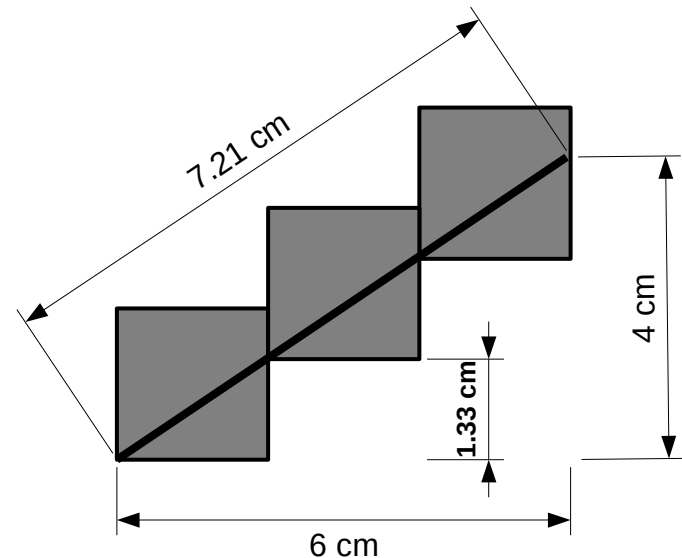
- 1) Work out how many walls we need
- 2) Work out the x and y step
- 3) For each wall (i):
 - $x = \text{startX} + \text{halfSize} + (\text{stepX} * i)$
 - $y = \text{startY} + \text{halfSize} + (\text{stepY} * i)$
 - create a wall at (x,y)



Count = $10 / 2 = 5$
Step X = 2
Step Y = 0



Count = $7.21 / 2 = 3$
Step X = 2
Step Y = 1.33



A Module not a Class

- So far we've had 1 class per module, but for this code we are working with groups of functions instead of with concrete objects
- The Map Generator is not a class, but is instead a collection of functions that can be used to spawn walls across a map.
- Levels are just functions (methods) that create all the obstacles, spawners and things in each level, and add them to the game engine.
- These are more like configuration methods than actual objects in our game.
 - These might also add the player in too! Don't forget that!

The Fun Part.

(actually coding stuff)

Download these slides.

`github.com/JamesAdey/zompy/blob/master/slides/cc_week5.pdf`

Integrating the Levels

- I've provided you with a basic map generation module, as well as 2 levels and a rock wall item.
- 4 more files to add to the project:

github.com/JamesAdey/zompy/blob/week5/level_random.py

github.com/JamesAdey/zompy/blob/week5/level_cross.py

github.com/JamesAdey/zompy/blob/week5/mapgenerator.py

github.com/JamesAdey/zompy/blob/week5/rockwall.py

- Then follow the instructions in the following slides.

Edit: *zompy_engine.py*

- *Remember to add the import statements, only import the file as a module, instead of all the contents.*

```
from item_manager import *
from navgrid import *

# these are not a class currently
# but a suite of helper methods
import level_random
import level_cross

class ZompyGlobals(GameGlobals):
    zoms = 10
    bulletManager = None
```

- ***Inside the setup_game function:***
- *Create a variable to hold the current level name*
- *Then check the level name and call the correct generation function*

```
# Create a nav grid
ng = NavGrid(resolution=20)
super().add_game_object(ng)
gGlobals.navGrid = ng

levelName = "cross"

if(levelName == "random"):
    level_random.create_level(super(),gGlobals)
elif(levelName == "cross"):
    level_cross.create_level(super(),gGlobals)
else:
    print("ERROR Could not create level!")
```

Create: *level_custom.py*

- Following the template in the existing levels add any required import statements!
- Define a `create_level` function
- **Cut** and **paste** any blocks of code containing level setup information **from** *zompy_engine.py*
- Change any references to **`super()`** into **`gameEngine`**
- Don't forget to add a player to your custom level!

level_custom.py

```
from player import *
from example_item import *
from zombie_gridwalker import *
from zombie import *
# this is not a class currently
# but a suite of helper methods
import mapgenerator

def create_level (gameEngine, gameGlobals):

    ...

    -----
    Add Your Level Generation Code Here
    -----

    ...

    # create a zombie spawner
    zs = ZombieSpawner(x=100,y=100)
    gameEngine.add_game_object(zs)

    # ALWAYS remember to create the player!
    pl = Player(x=300,y=300)
    gameEngine.add_game_object(pl)
    gameGlobals.player = pl
```

zompy_engine.py

```
gameGlobals.itemManager = im
super().add_game_object(im)

# create a zombie spawner
zs = ZombieSpawner(x=100,y=100)
super().add_game_object(zs)

# create a nav grid
ng = NavGrid(resolution=20)
```

Play it!

- Now is the time to test and see if your changes work!
 - You should notice that the walls block bullets and shooting (but not the lines drawn). I'll get a fix for this in the future.
 - Walls also don't block player movement, but you could make them slow the player down...
- **Can you play the two example levels?**
- **Can you modify the code to play your custom level?**
- Once you're done, continue on to the bugfixes slides.

A bugfix!

- There is a bug with the player code, that means that it's collision radius is always zero, so collisions aren't being detected correctly.
 - It inherits the function from `GameObject`, which by default returns zero.
 - *From a code architecture perspective... Would it be better for `GameObject` to not define this function, and throw errors when running, maybe this bug would have been found sooner...*
- Adding a function definition for `get_collision_radius` should fix this.
- In **player.py**, add this function:

```
def get_collision_radius(self):  
    return self.radius
```
- This should the bug, and the player should detect collisions with walls as soon as they touch.

Free Play & Extensions.

- Now it's unguided work! But here's some suggestions:
- **Create your own levels!**
 - Keep editing *level_custom.py* or make an entirely new one!
 - Can you define your own random generation functions?
- **Add obstacles that damage zombies and players**
 - Try editing the *on_collision* function to send a take damage message when an obstacle collides with a player/zombie.

Feedback

- Did you enjoy the more practical session?
- Are the code examples included on the slides helpful?
- We have 3 weeks left, and there's still more I want to cover.
 - ~~Pathfinding~~
 - ~~Levels/Maps~~
 - Scoring
 - Special Zombies