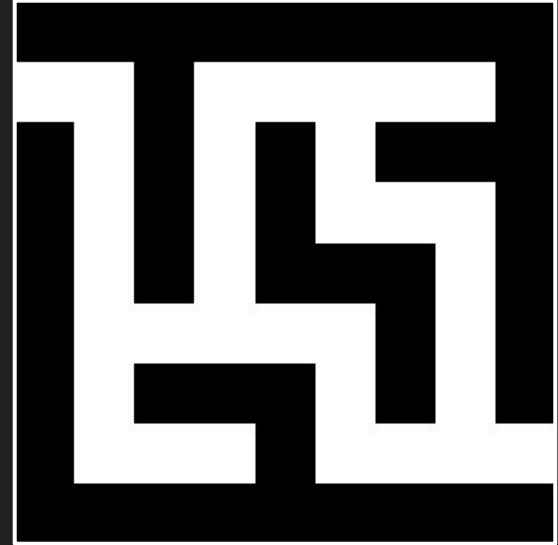


# Breadth First Search for Pac-Man

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Szymanski

# What is BFS?

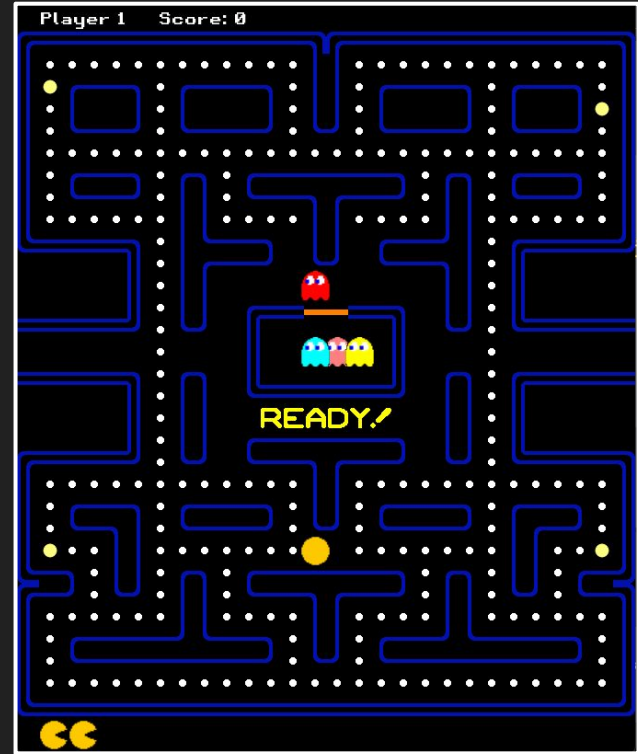
- Finds shortest path between 2 points
- Checks each path at the “same time”
- Very common useful alg



By NeptoTech - Own work, CC  
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<https://commons.wikimedia.org/w/index.php?curid=117161963>

# Problems?

- Typical usage point-to-point
- We need it to find a path through every Pacgum (the dots)



# Strategy

- Preprocess the path at Pac-Man initialization
- Store sequence of directions in queue
- Track number of remaining Pacgums with each move
- Search all directions at each junction
- Return the first queue that collects all Pacgums

Direction	Pacgums
left	244
left	243
up	242
...	...
down	0

# Usage

- On each move Pac-Man's algorithm's `get_dir()` method is called
- BFS algorithm's `get_dir()` method dequeues the first direction of the stored direction queue
- On Pac-Man death, re-search the maze

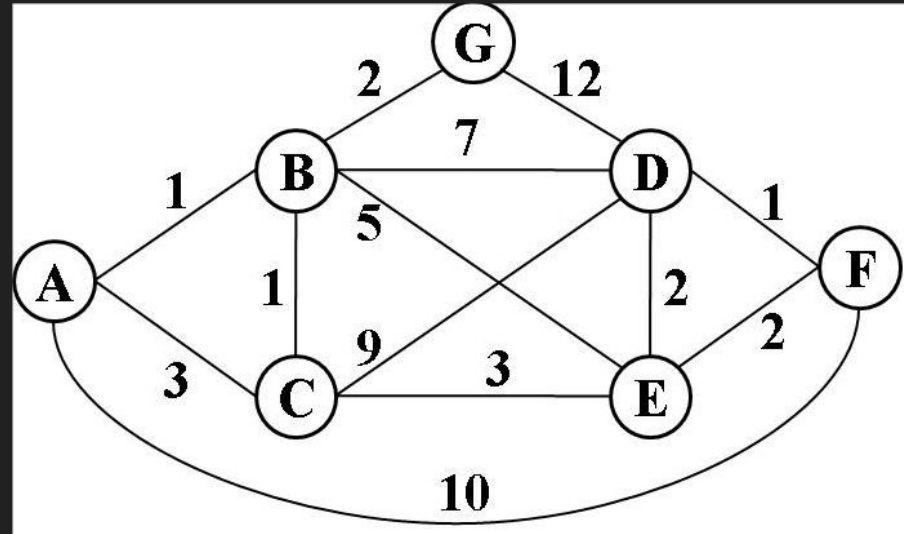


# Complexity

Naive implementation? A lot.

General case improved with optimizations:

- Process graph of junctions
- Store generated queues



# In General

Algorithm to find the “optimal” path through a given subset of edges in a given graph.

