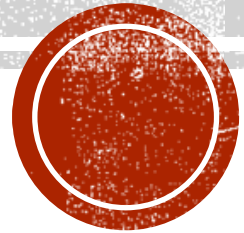
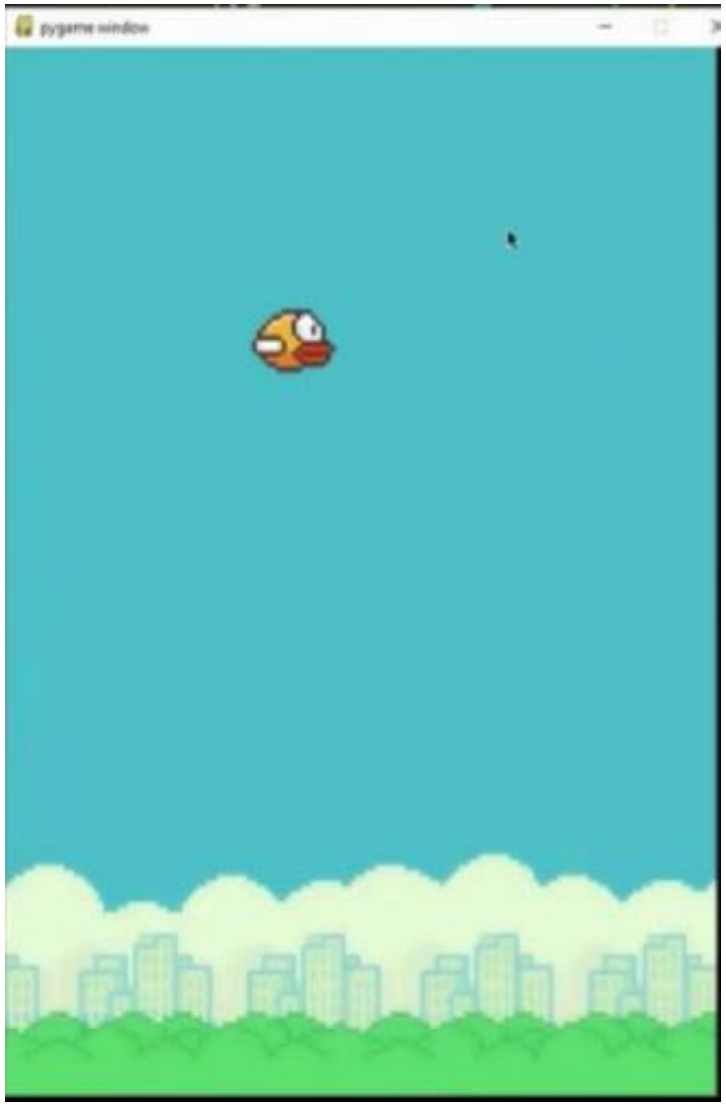
N.E.A.T - FLAPPY BIRDS



- Aman Sharma - B2021005
- Davis John - B2021016
- Luv Saxena - B2021023
- Manali Hedaoo - B2021025
- Sumit Grover- B2021048

Initial Game Setup




```
def draw_window(win, bird):
    win.blit(BG_IMG, (0,0))
    bird.draw(win)
    pygame.display.update()


def main():
    bird = Bird(200,200)
    win = pygame.display.set_mode((
    clock = pygame.time.Clock()

    run = True
    while run:
        clock.tick(30)
        for event in pygame.event.g
            if event.type == pygame
                run = False

        bird.move()
        draw_window(win, bird)

    pygame.quit()
    quit()

main()
```

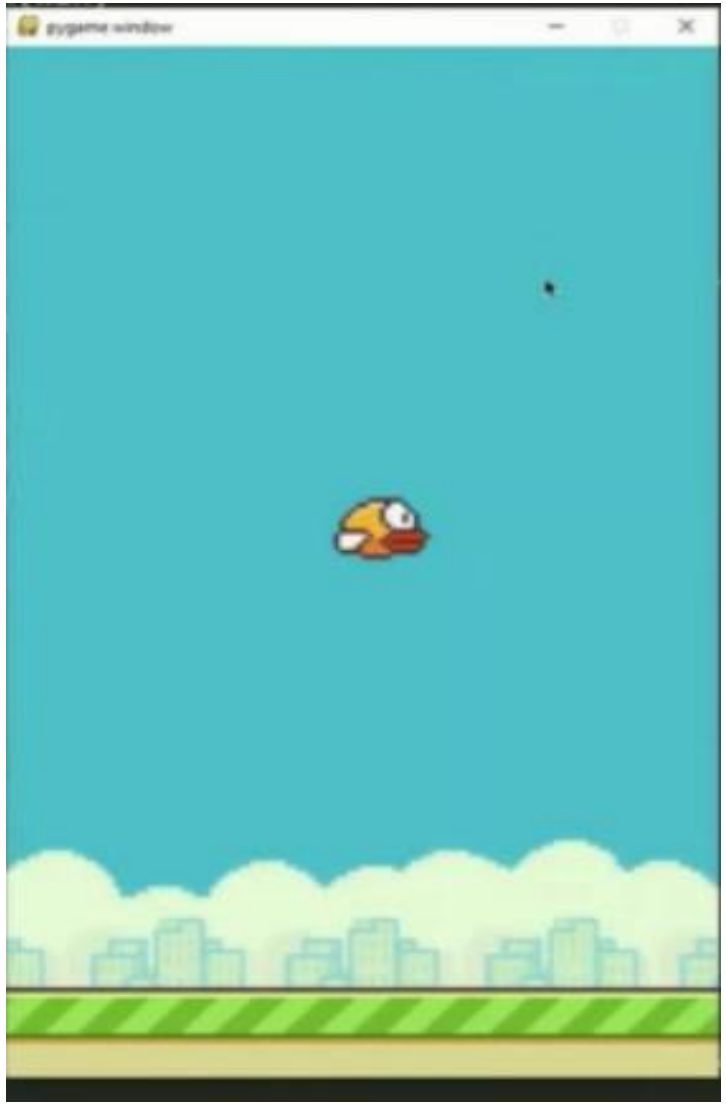
game 1.9.4

- Introducing the clouds, floor and the bird
- Animating the bird to move its wings

- Adding the falling & the jumping functionality

- Looping over & maintaining the environment state

Environment Setup

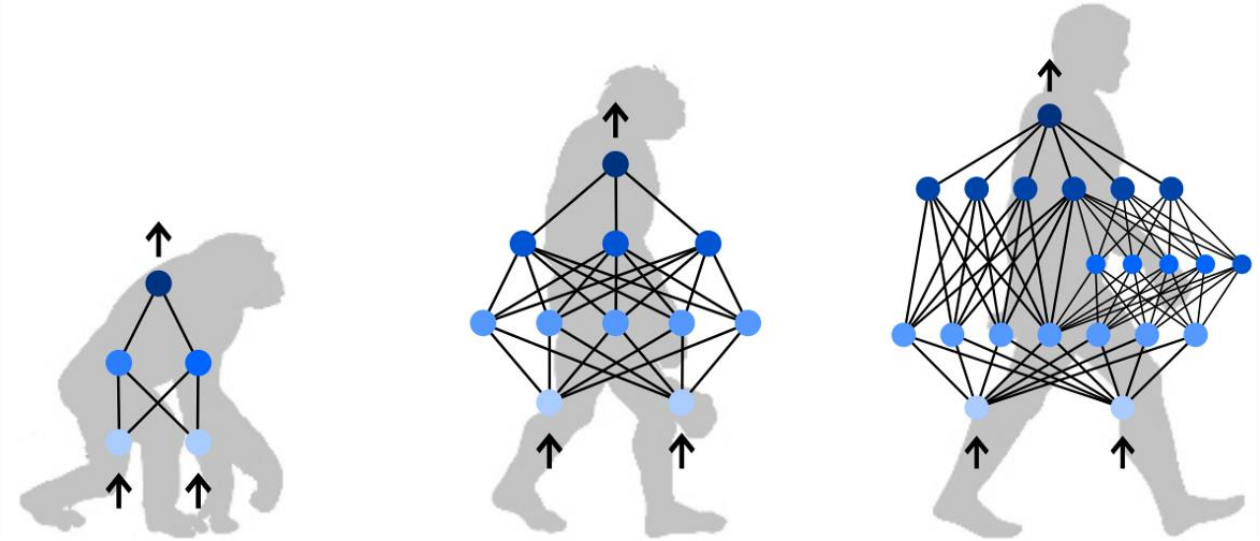


- Animating bird & floor to resemble gameplay

- Generating pipes, while calculating random heights with enough space for jump

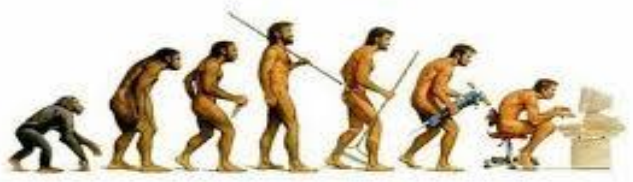
- Looping over & maintaining the environment state

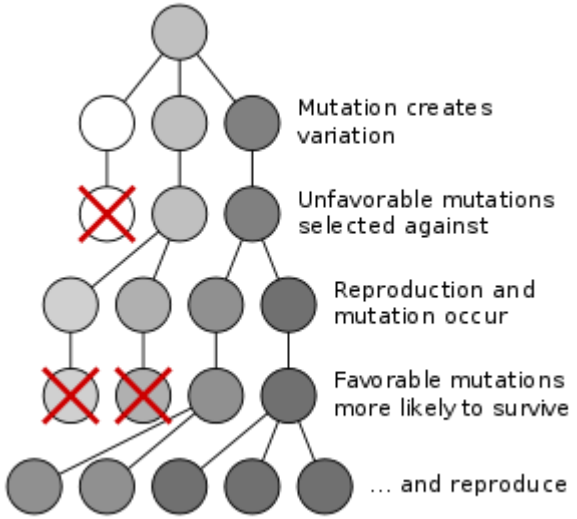
N.E.A.T



NeuroEvolution of augmenting topologies

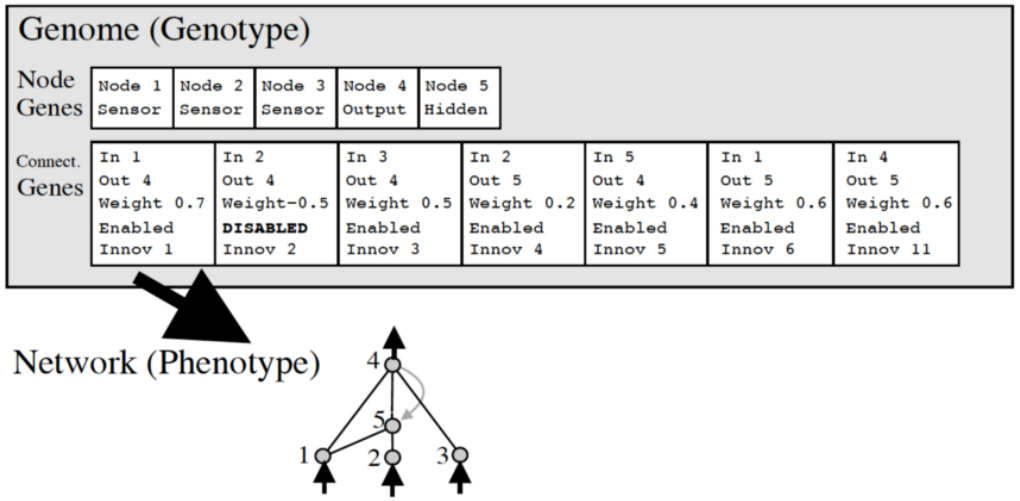
“Survival of the **FITTEST**”



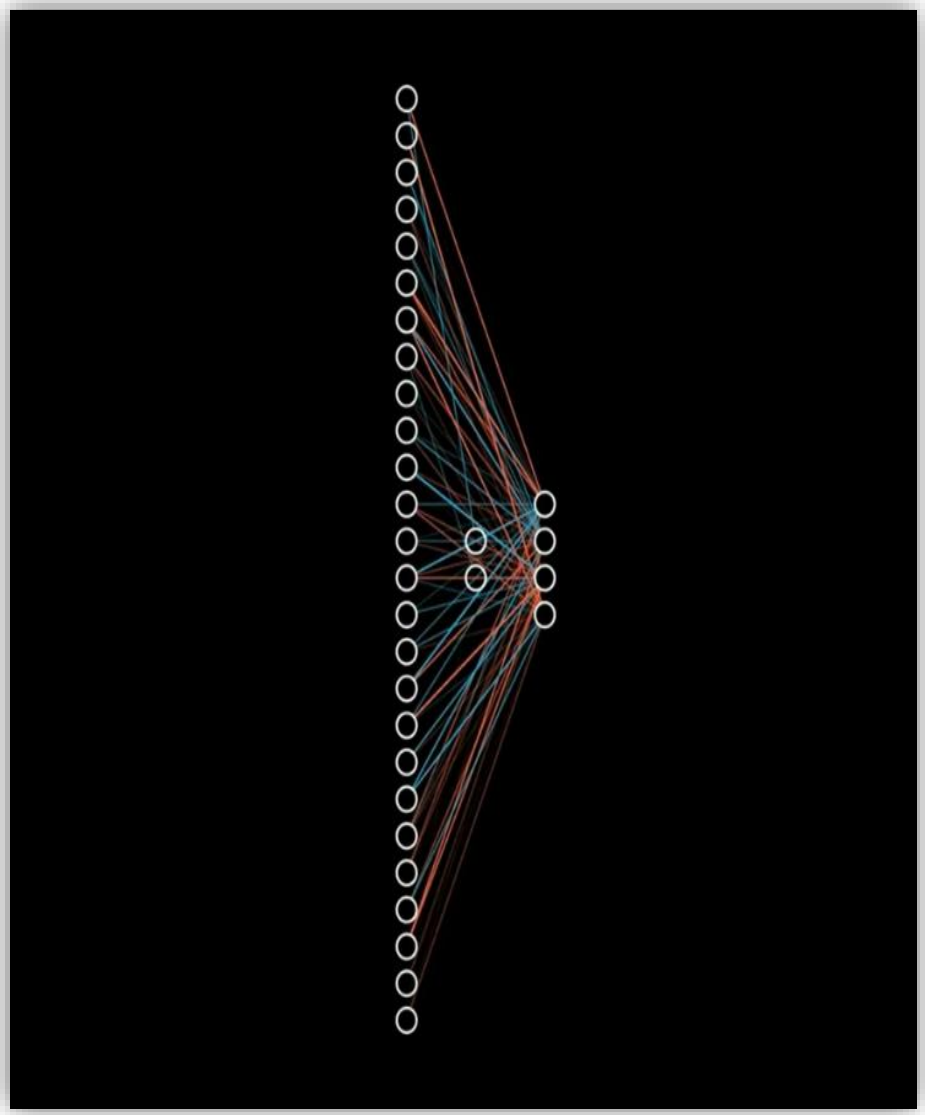


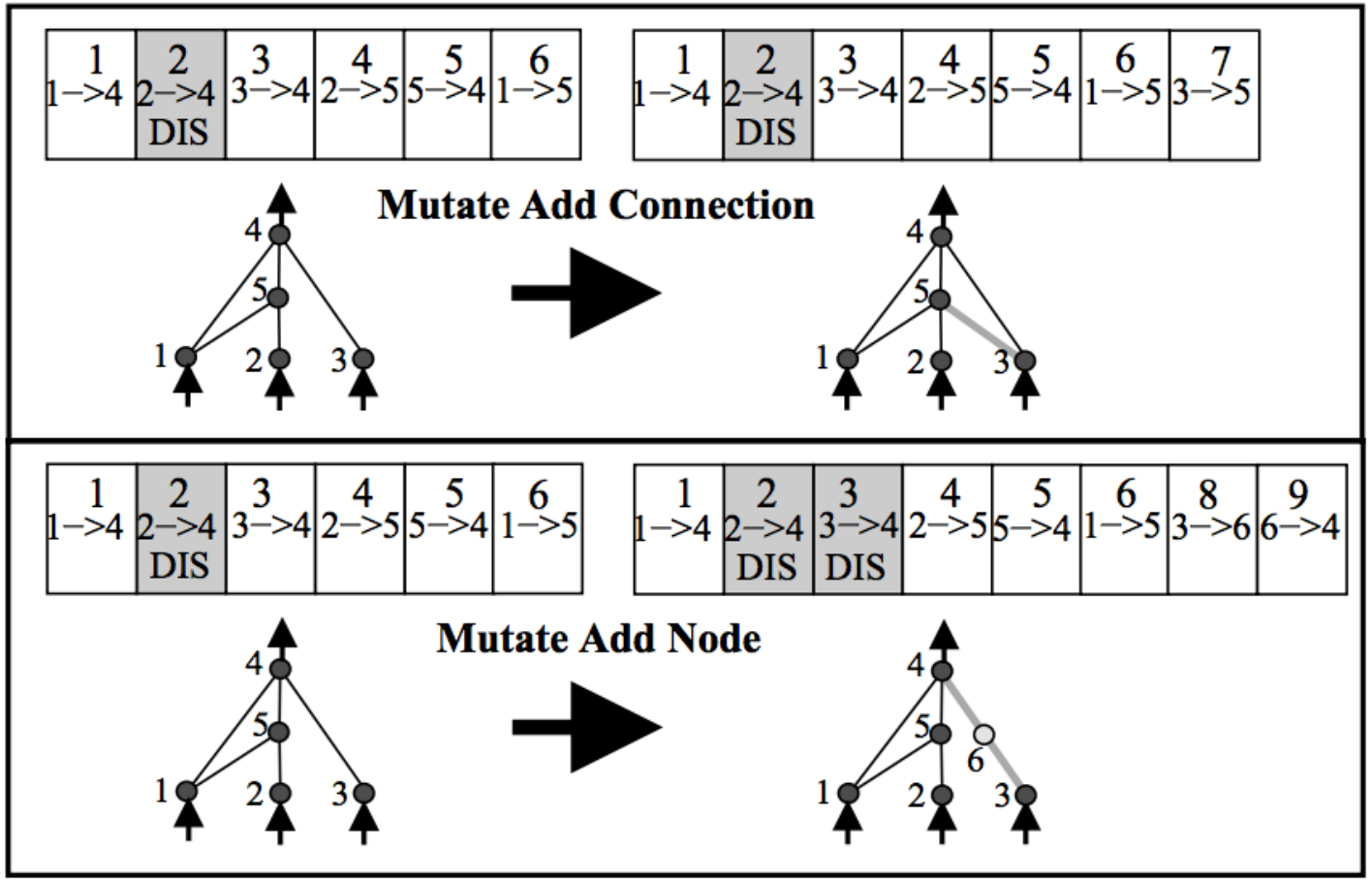
N.E.A.T

- “Neural Networks through Augmented Topologies” - describes algorithmic concepts of self-learning machines that are inspired by genetic modification in the process of evolution.

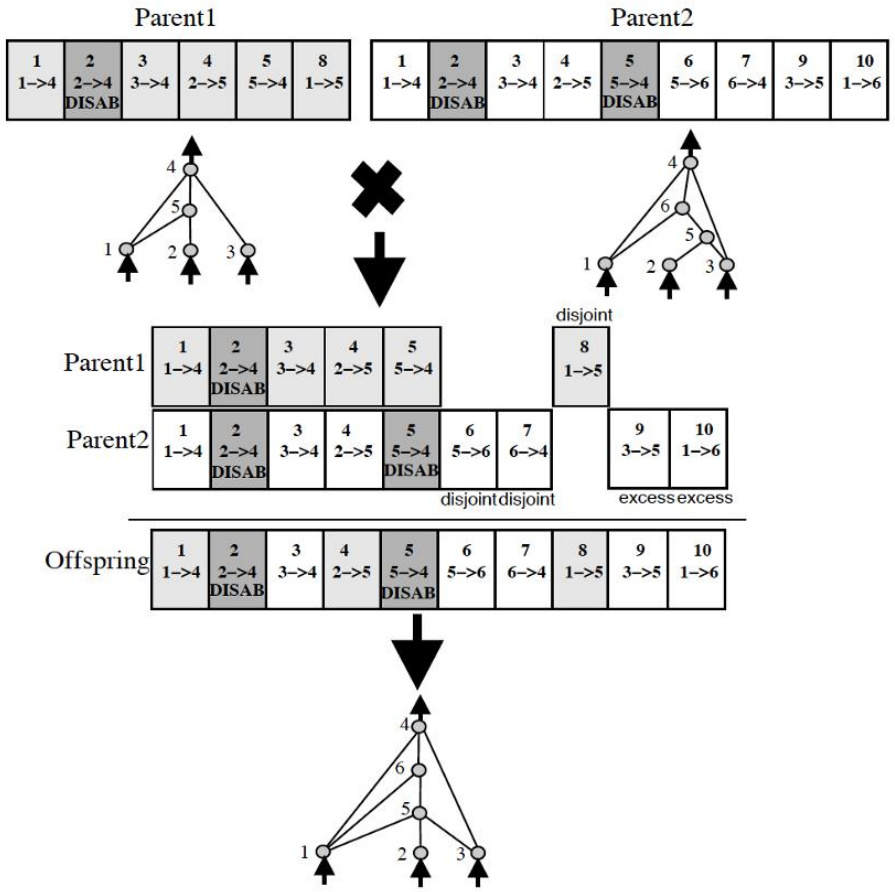


N.E.A.T – Mutation Explained





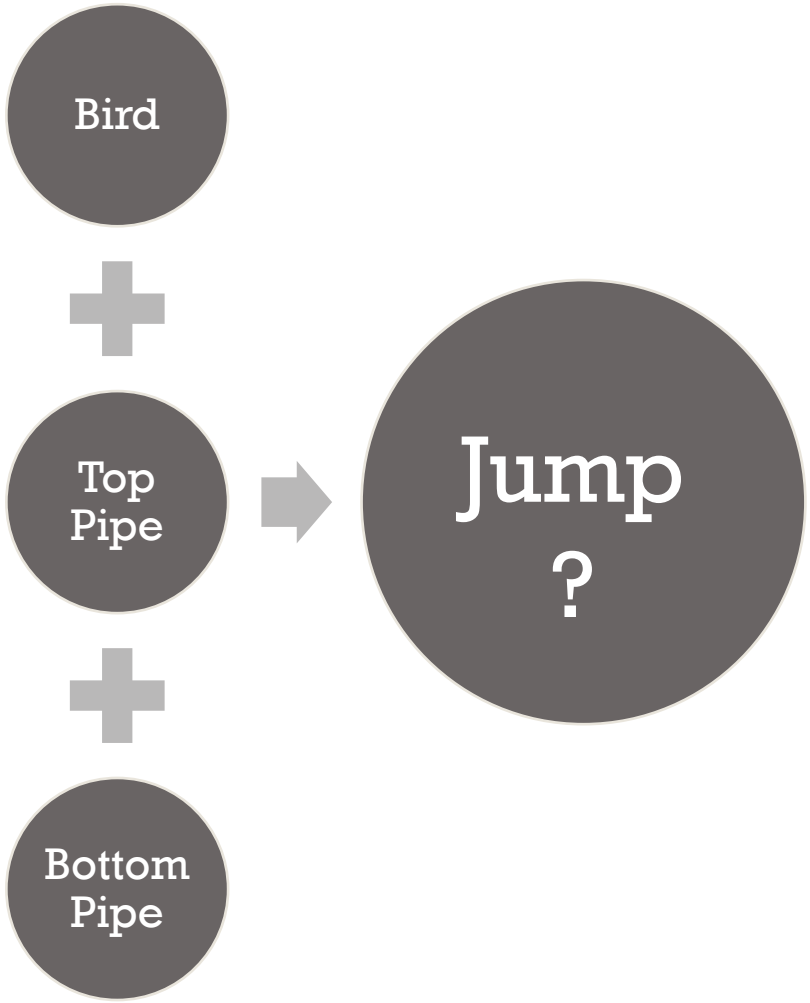
Competing Conventions & Speciation



"Blindly crossing over the genomes of two neural networks could result in networks that are **horribly mutated and non-functional**. If two networks are dependent on central nodes that both get **recombined out of the network**"

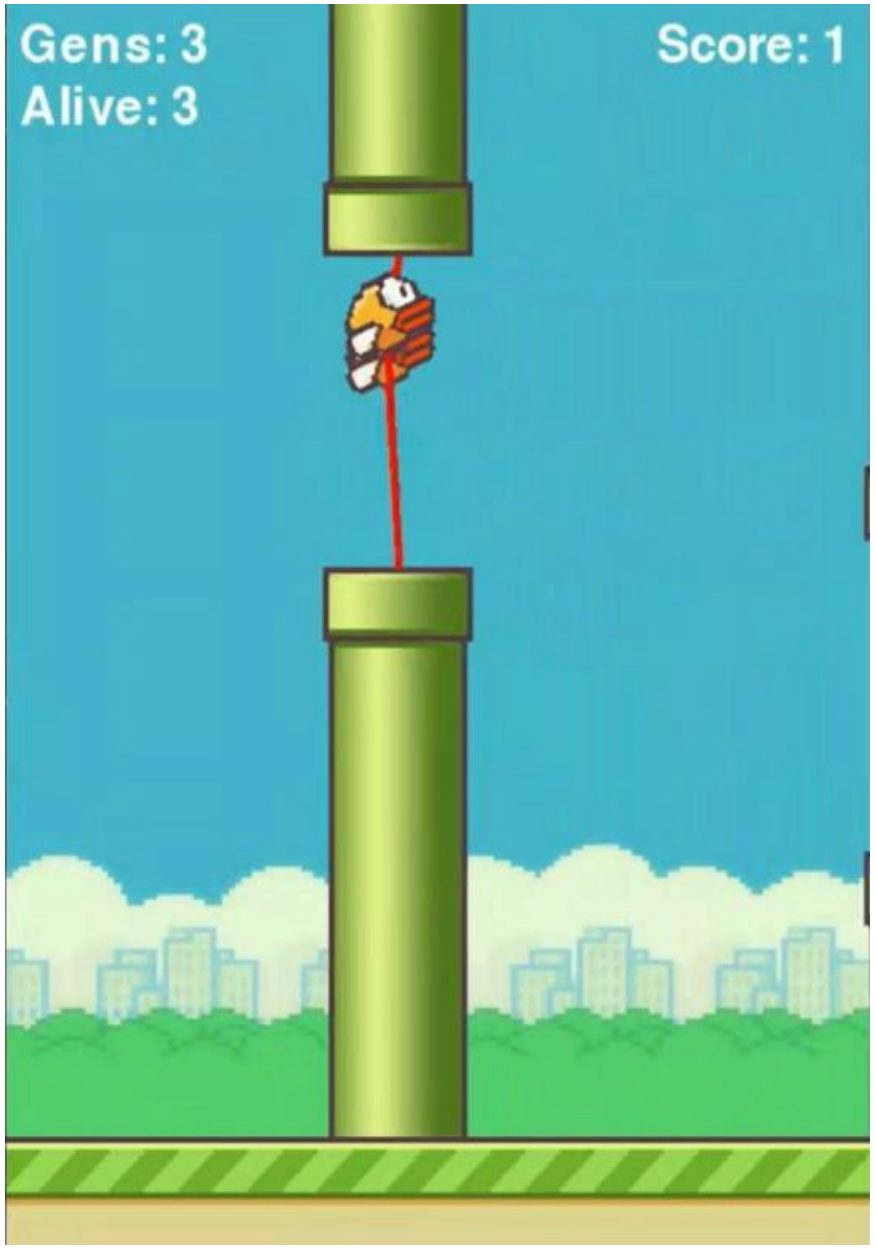
"Adding new connection or node before any optimization of weights have occurred often leads to a lower performing individual."

Explicit fitness sharing

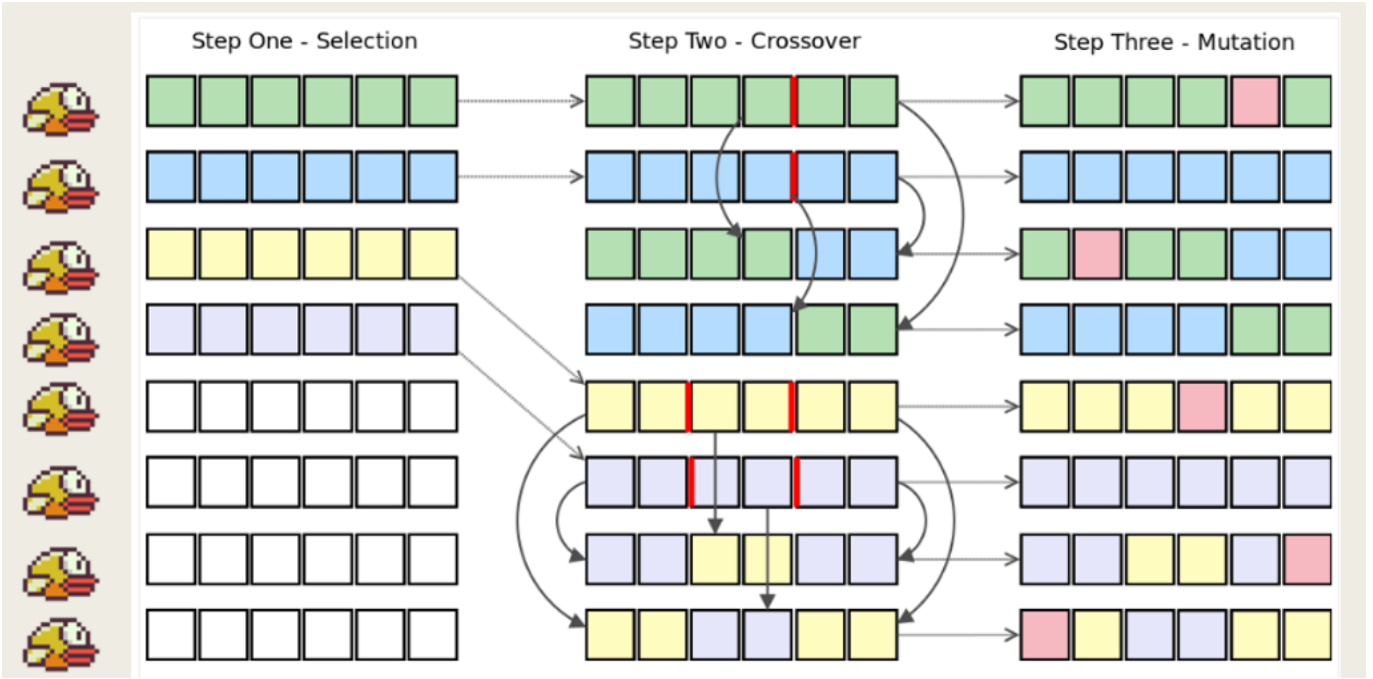
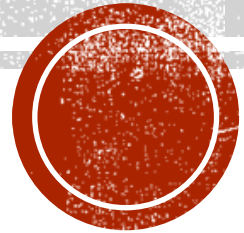


AI LEARNS

- Inputs
- Outputs
- Activation Function
- Population Size
- Fitness Function
- Maximum Generations


Gens: 3
Alive: 3
Score: 1

FLAPPY BIRD


Step One - Selection
Step Two - Crossover
Step Three - Mutation

THANK YOU !!