

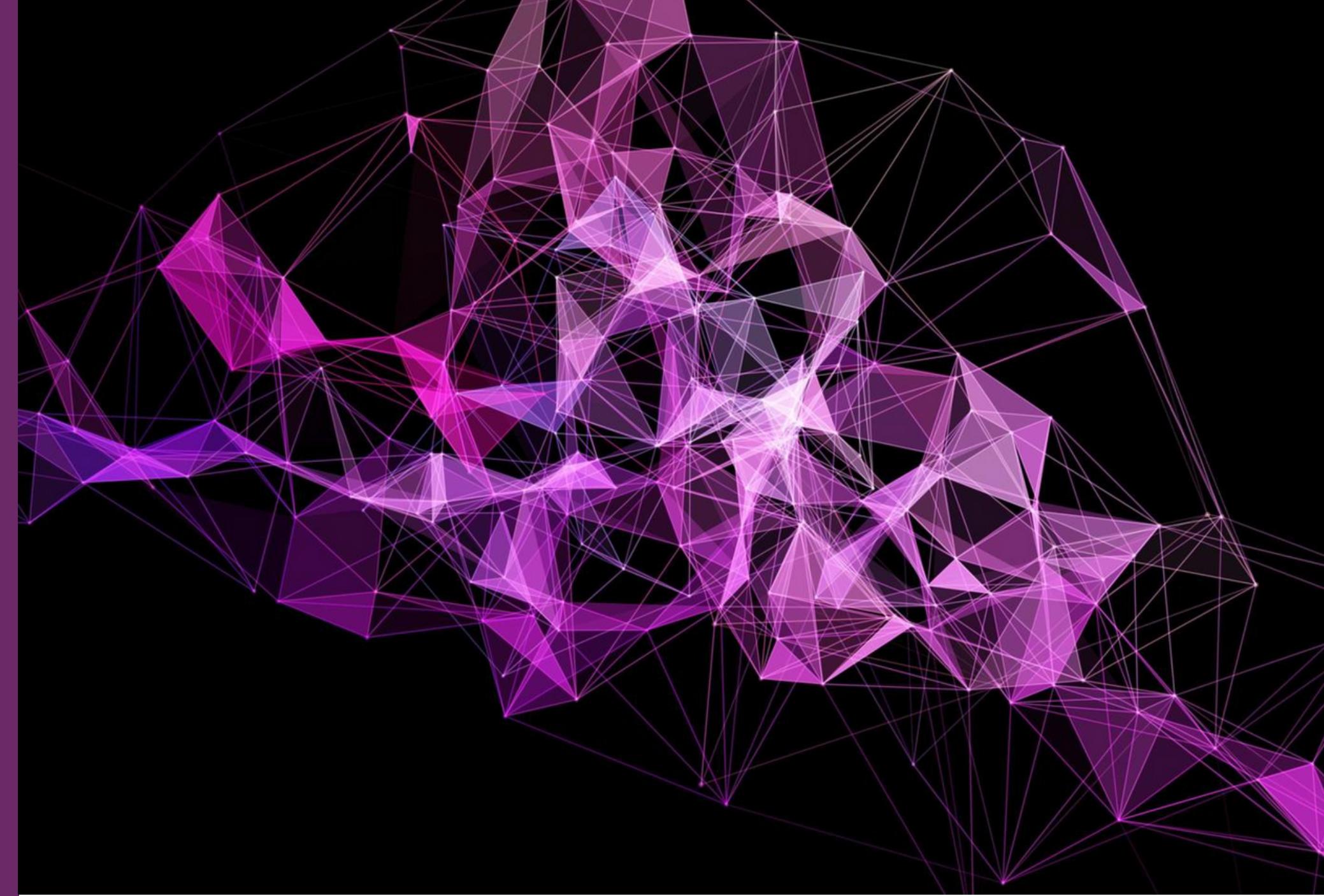
CREAT-A-THON

PLEXUS





TEAM MEMBERS



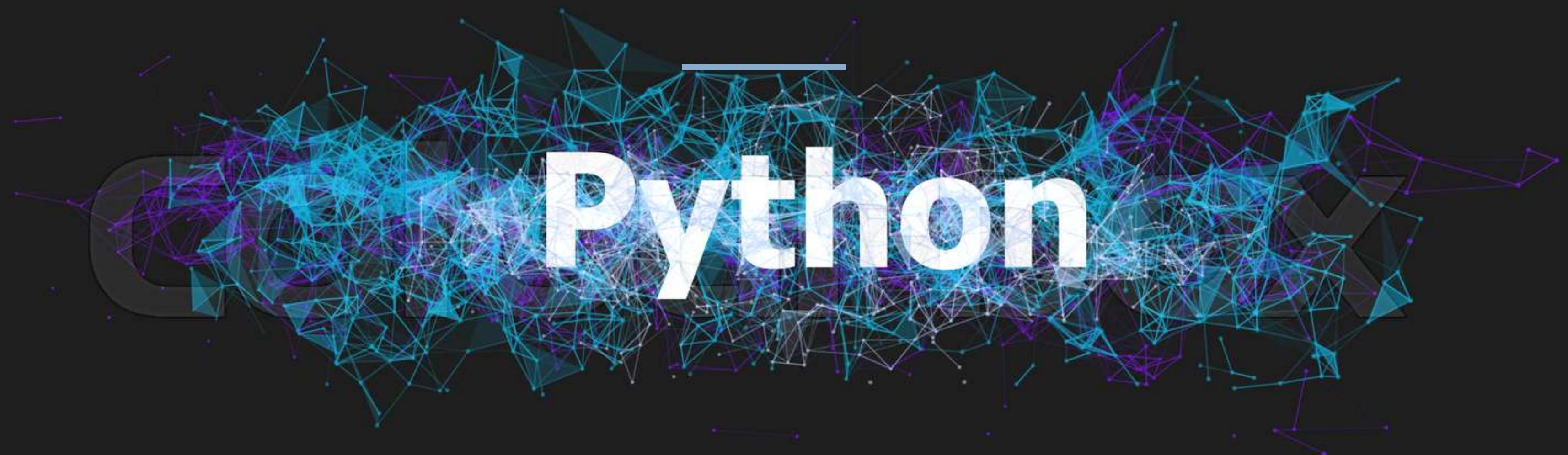
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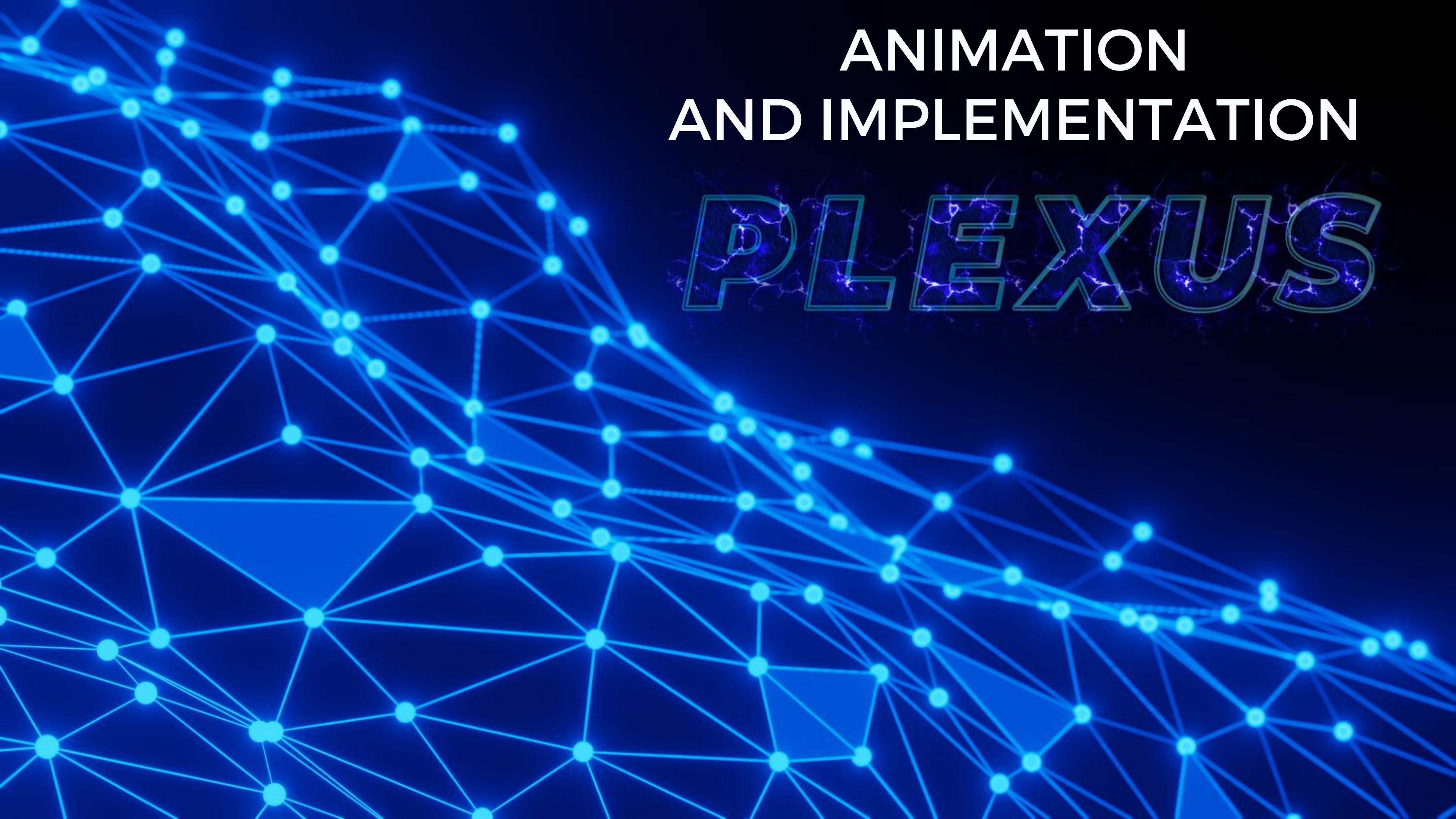
WHAT IS A PLEXUS?

PLEXUS IS A COMPLICATED STRUCTURE WITH AN EXTENSIVE SYSTEM OF CIRCLES THAT ARE CONNECTED BY A NETWORK OF LINES.

OUR PROJECT CREATES A PLEXUS WHICH JOINS ANY TWO POINTS WHOSE DISTANCE IS LESS A SET MAX DISTANCE.

LANGUAGE USED





ANIMATION AND IMPLEMENTATION

PLEXUS

```
1 import os
2 import pygame as pg
3 from random import randint, uniform
4 from math import sqrt
5
6 os.environ['SDL_VIDEO_CENTERED'] = '1'
7 RES = WIDTH, HEIGHT = 1920, 1080
8
9 FPS = 60
10 BLACK = (0, 0, 0)
11 RED = (51, 0, 102)
12 velocity = 0.8
13 max_distance = 200
14
15 pg.init()
16 screen = pg.display.set_mode(RES)
17 clock = pg.time.Clock()
18
19 #defining a class circle containg all the functions regarding the making of circles
20 class Circle:
21     def __init__(self, quantity):
22         self.quantity = quantity
23         self.circles = []
24         self.velocity = [velocity, velocity]
25         self.create_circles()
26
27     def create_circles(self):
28         for _ in range(self.quantity):
29             self.x = randint(0, WIDTH)
30             self.y = randint(0, HEIGHT)
31             self.velocity_x = uniform(-self.velocity[0], self.velocity[0])
32             self.velocity_y = uniform(-self.velocity[1], self.velocity[1])
33             self.position = (self.x, self.y, self.velocity_x, self.velocity_y)
34             self.circles.append(self.position)
35
```

```
36     def update(self):
37         self.circles_moved = []
38
39         for i in self.circles:
40             self.x = i[0]
41             self.y = i[1]
42
43             self.velocity_x = i[2]
44             self.velocity_y = i[3]
45
46             self.x += self.velocity_x
47             self.y += self.velocity_y
48
49             if self.x >= WIDTH or self.x <= 0:
50                 self.velocity_x *= -1
51
52             if self.y >= HEIGHT or self.y <= 0:
53                 self.velocity_y *= -1
54
55             self.position = (self.x, self.y, self.velocity_x, self.velocity_y)
56             self.circles_moved.append(self.position)
57             self.circles = self.circles_moved
58
59     def connect_circles(self):
60         self.lines = []
61         for p0 in range(self.quantity - 1):
62             for p1 in range(p0 + 1, self.quantity):
63                 self.lines.append([self.circles[p0][:2], self.circles[p1][:2]])
64
65         return self.lines
66
67 #function to define the color of the vector drawn from one circle to another
68 def color(distance, max_distance):
69     x = int((max_distance - distance) * 255 / max_distance)
70     return x, 0, 0
```

```
71
72 #taking 100 circles
73 circles = Circle(100)
74
75 #main code
76 def main():
77     running = True
78     while running:
79         clock.tick(FPS)
80
81     for event in pg.event.get():
82         if event.type == pg.QUIT:
83             running = False
84         if event.type == pg.KEYDOWN:
85             if event.key == pg.K_ESCAPE:
86                 running = False
87     #background black
88     screen.fill(BLACK)
89     # Draw lines
90     for i in circles.connect_circles():
91         start_position = i[0]
92         end_position = i[1]
93         distance = sqrt((start_position[0] - end_position[0]) ** 2 + (start_position[1] - end_position[1]) ** 2)
94
95         if distance < max_distance:
96             pg.draw.line(screen, color(distance, max_distance), start_pos=i[0], end_pos=i[1], width=4)
97     # Draw circles
98     for i in circles.circles:
99         pg.draw.circle(screen, RED, center=i[:2], radius=5)
100
101     circles.update()
102
103     pg.display.update()
104
105 #main call
106 if __name__ == "__main__":
107     main()
```

Uses of Plexus

Can be used to create different structures



For creating blueprints



They're also utilized in the medical profession in a variety of ways to show specific body systems, such as the nervous system's connectivity or the vast network of blood vessels that run throughout the body.

Thank
you!