OFFICE COVID SIMULATOR

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WHAT IS THE NEED FOR THIS PROJECT?

Post pandemic, as the world resumes back to normal and office spaces start opening, the need to take as many preventive measures as possible to ensure that the situation stays under control becomes important.

This simulator helps administration within offices to make sure that the guidelines are set in a way, such that maximum number of people can be protected from the virus and minimize the harm to the company because of office shutdowns etc.

CLASSES USED

POSITION

EMPLOYEE

MOVEMENT

CAFETERIA

WASHROOM

MEETING ROOM

POSITION CLASS

Private Data Members

- X co-ordinate of position - double type
- Y co-ordinate of position - double type

Constructors

- Default Constructor - randomly assigns value to the x and y coordinates using the rand() function.
- Parameterized Constructor - assigns specified values to the x and y coordinates

Member Functions

- getDistance function - double type - used to calculate the distance between two positions
- at_Location function - bool type - to check if both the positions are not the same (using the close variable already defined)
- move_toward function - bool type - to check if the employee is moving toward a particular position and if not how far are they from that position.

EMPLOYEE CLASS

Constructors

- Default Constructor - sets the values of the data members as:

a. Assuming that the person only moves to use the cafeteria, washroom or the meeting room i.e sets the value of the movement to the cafeteria, washroom or the meeting room.

b. In the movement object invokes the setPerson function

c. Initializes the disease counter to the infection time (24*15)

Member Functions

- try_infect function - bool type - to check if a person can infect another person or not
- is_alive function - bool type - to check if the person is alive or not
- progress_disease - void type - used to set the progress of an infected person (is the person dead because of the virus)

MOVEMENT

Private Data Members

- A data member which is a pointer to the object of class Employee

Constructors

- Default Constructor - sets the pointer at NULL

Member Functions

- move() function - virtulal void - defined later in different derived classes

CAFETRIA, WASHROOM, MEETING ROOM

Private Data Members

- 2 pointers of objects of the position class : 1 for the location of work station and the other for the location of new place where this person goes to
- speed - int type - defines the speed with which a person moves
- stay - double type - defines the time for which the person stays at that particular place
- work_station_probaility - double type - defines the probability that the person stays in their work station and safely social distances

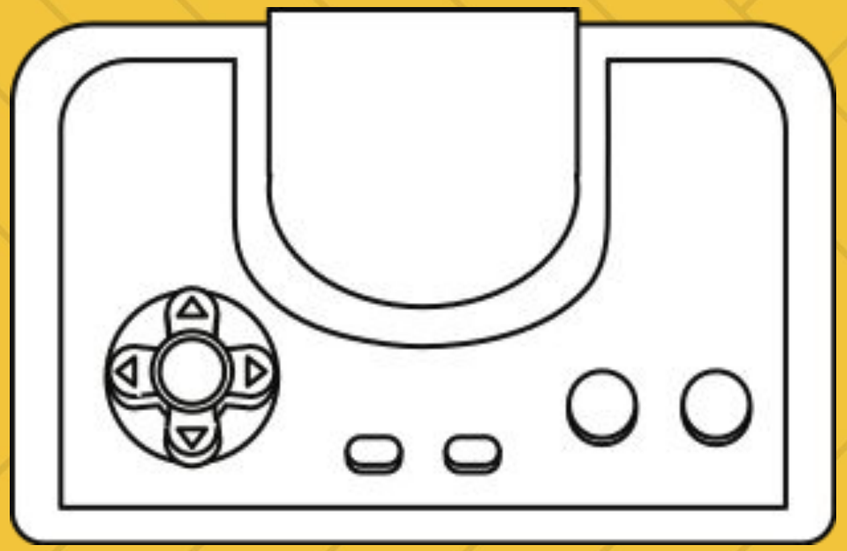
Constructors

- Default Constructor - sets the speed of the person at that particular place to be -1; calls the randomizer function to check if the probability that the person social distances at the work station is true or false, if true it sets the value of work_station_probability to 0.099 else it sets it to 0.2

Member Functions

- pick_a_waypoint : randomly selects the value of speed and stay and check for the probability that the person stays at the place or moves towards any of these places, if it is true sets the waypoint as work_station else sets it to one of the popular places in the office space
- move function : checks if the speed is zero. if it is true : proceeds to set the employee's position as that of the work station, then calls the pick_a_waypoint function, if the position of the employee is the same as the waypoint, it reduces the stay and if stay is <0, it calls the pick_a_waypoint function, else it simply moves the employee towards

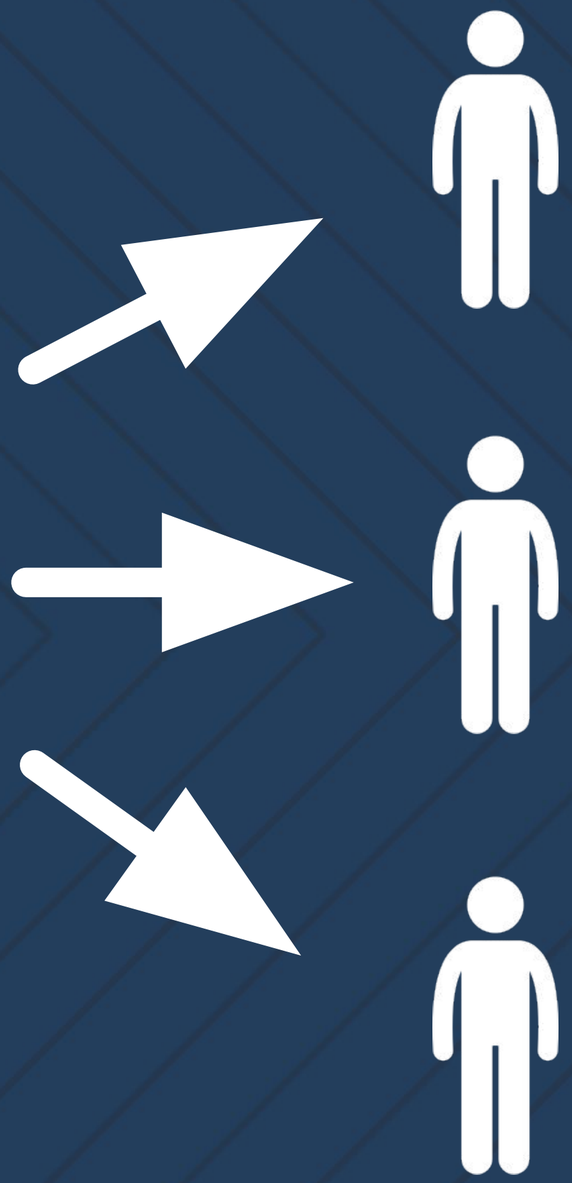
WORKING OF THE SIMULATION



Sets the status of the initially infected people to INFECTED

Starts the simulation process

Starts to alternatively move people

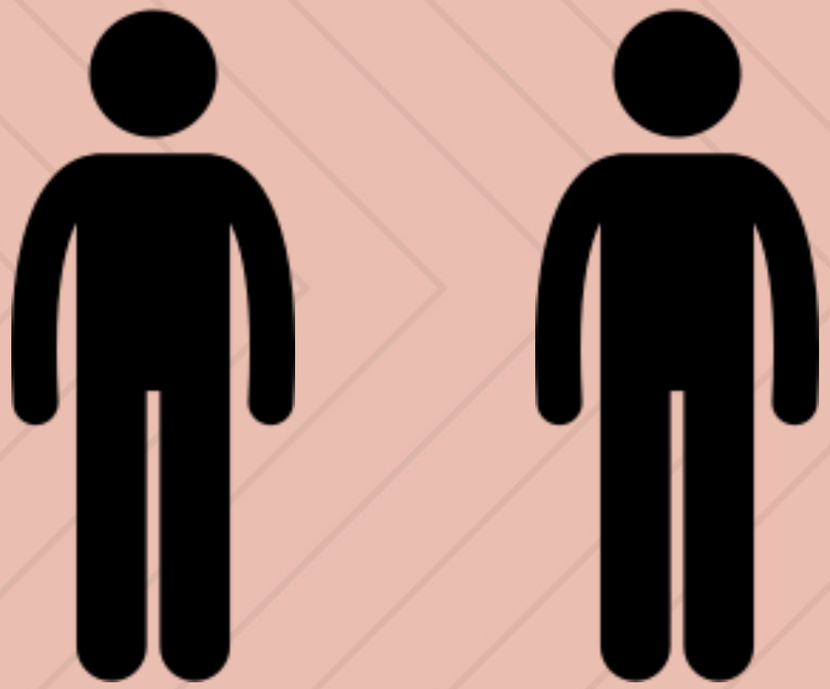


Moves this person to the cafeteria

Moves this person to the washroom

Moves this person to the meeting room

Starts to affect people

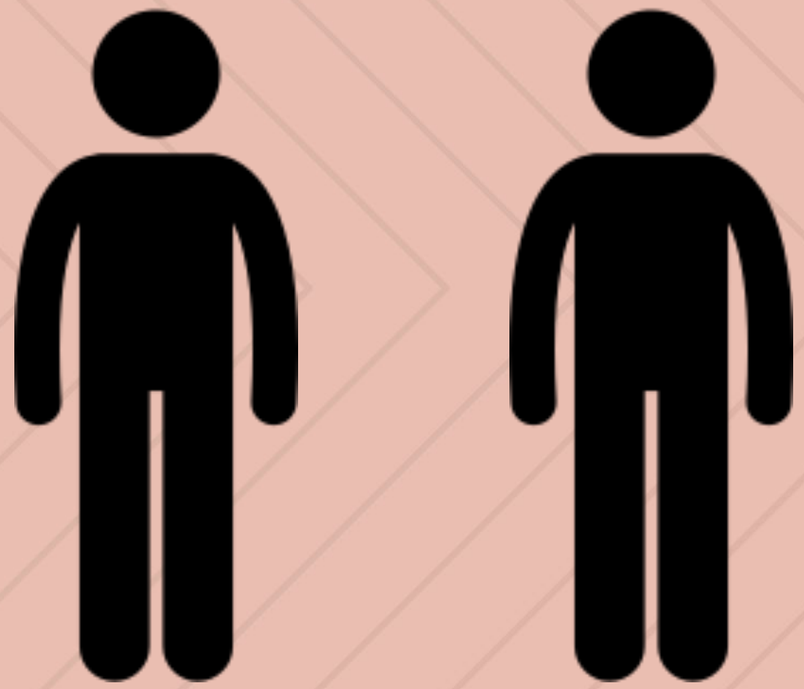


Used to infect other people

This person is now moving and come in contact with some other person

Depending on the distance between these

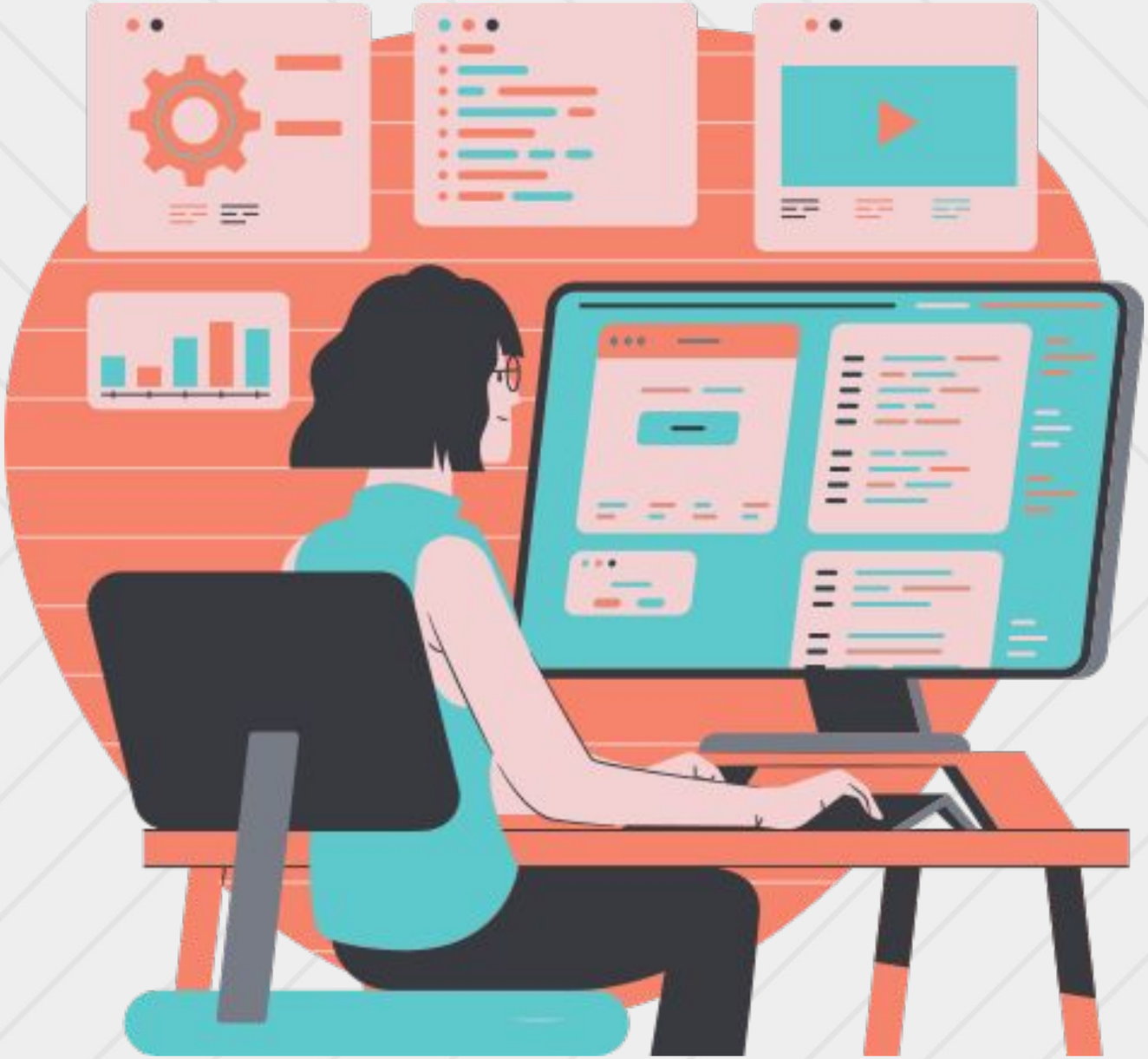
Starts to affect people



If the other person is not infected then it returns false

If the distance between the two people is greater than 0.75 m, it returns false

In an other case, it infects



Let's look at the code now!