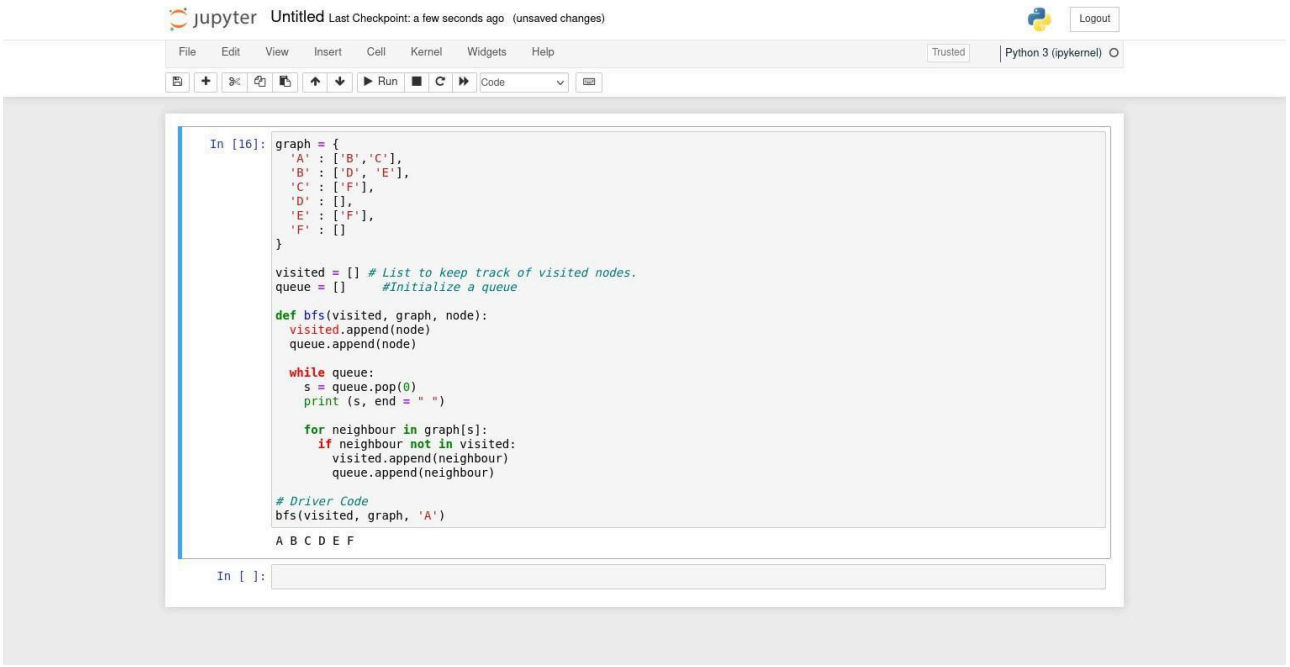
Name:-
Roll No.:-
Div:-

Title:- Implement DFS and BFS Algorithm. Use and Undirected Graph and develop a Recursive
Algorithm for searching all the vertices of the graph or tree data structure.

Program :-
Breadth First Search(BFS):-

```
graph = {
'A' : ['B','C'],
'B' : ['D', 'E'],
'C' : ['F'],
'D' : [],
'E' : ['F'],
'F' : []
}
visited = [] # List to keep track of visited nodes.
queue = [] #Initialize a queue

print ("Hello")
def bfs(visited, graph, node):
    visited.append(node)
    queue.append(node)
    while queue:
        s = queue.pop(0)
        print (s, end = " ")
        print ("Hello")

        for neighbour in graph[s]:
            if neighbour not in visited:
                visited.append(neighbour)
                queue.append(neighbour)
# Driver Code
bfs(visited, graph, 'A')
```

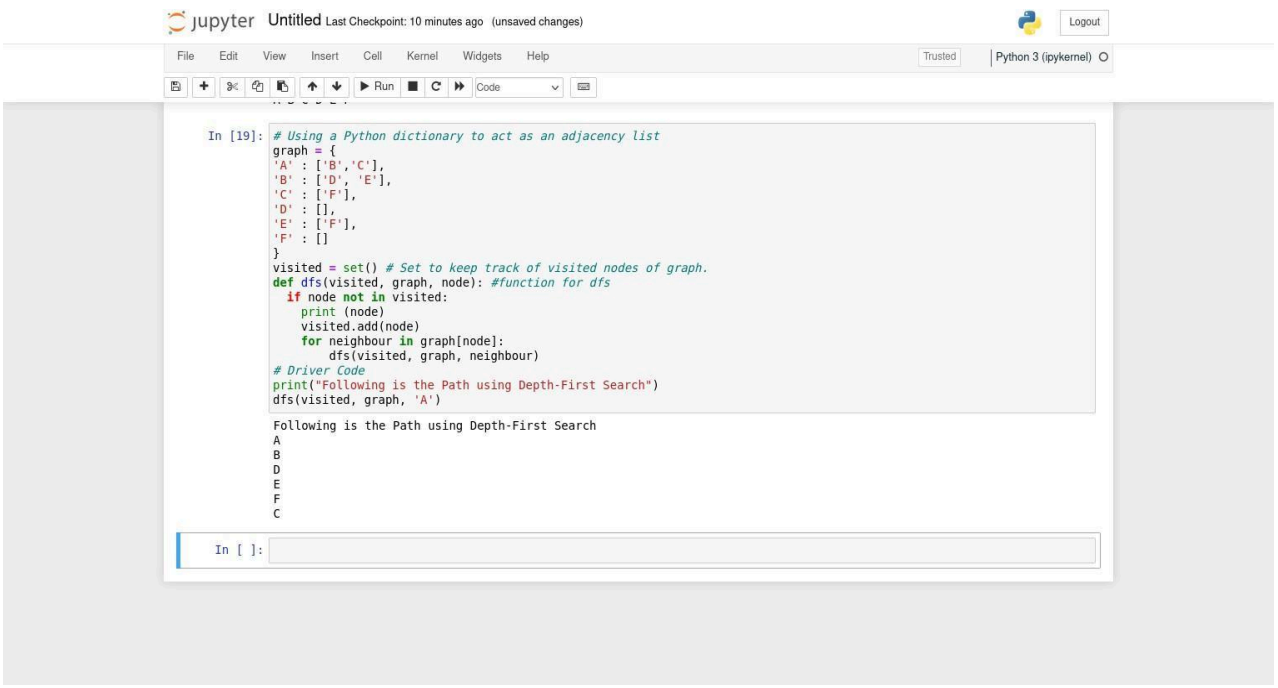


2. Depth-first Search:

```
# Using a Python dictionary to act as an adjacency list
graph = {
'A' : ['B','C'],
'B' : ['D', 'E'],
'C' : ['F'],
'D' : [],
'E' : ['F'], 'F' : []
}
visited = set() # Set to keep track of visited nodes of
graph. def
def dfs(visited, graph, node): #function for dfs
    if node not in visited:
        print (node)
        visited.add(node)
        for neighbour in graph[node]:
            dfs(visited, graph, neighbour)
print("Following is the Path using Depth-First
Search")
dfs(visited, graph, 'A')
```

Driver Code

print("Following is the Path using Depth-First Search")
dfs(visited, graph, 'A')



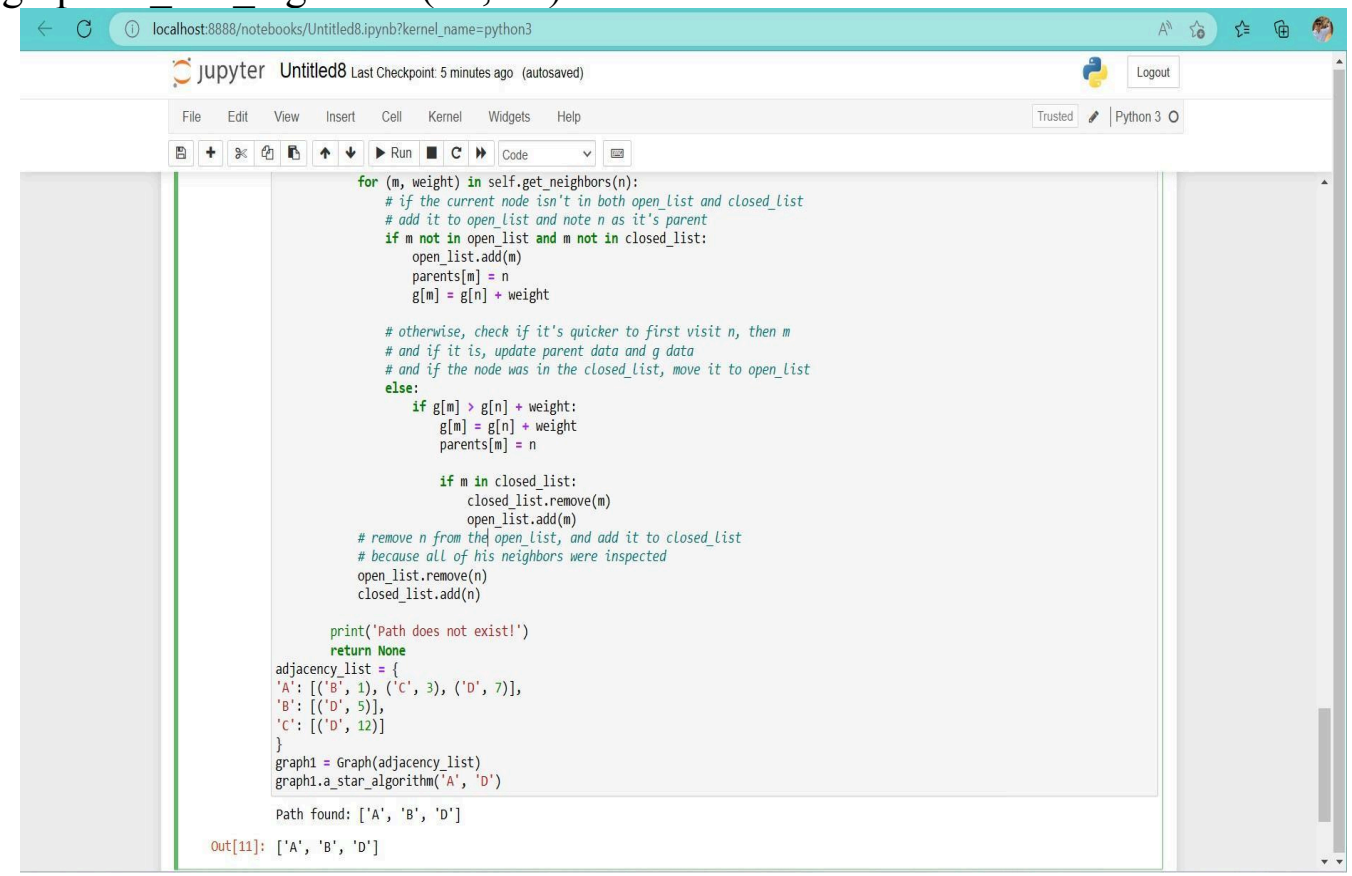
Name:-
Roll No.:-
Div:-

Title:- Implement A star Algorithm for any game search problem
Program :-
A* Algorithm

```
from collections import deque
class Graph:
# example of adjacency list (or rather map)
    # adjacency_list = {
    # 'A': [('B', 1), ('C', 3), ('D', 7)], # 'B': [('D', 5)],
    # 'C': [('D', 12)] # }

    def __init__(self, adjacency_list):
        self.adjacency_list = adjacency_list

    def get_neighbors(self, v):
        print("a")
        return self.adjacency_list[v]

    def h(self, n):
        H = {
        'A': 1,
        'B': 1,
        'C': 1,
        'D': 1
            }
        return H[n]

    def a_star_algorithm(self, start_node, stop_node):
        print("b")
        open_list = set([start_node])
        closed_list = set([])
        g = {}
        g[start_node] = 0
        parents = {}
        parents[start_node] = start_node
        while len(open_list) > 0:
```

```
            n = None
            for v in open_list:
                if n == None or g[v] + self.h(v) < g[n] + self.h(n):
                    n = v;
            if n == None:
                print('Path does not exist!')
                return None
            if n == stop_node:
                reconst_path = []
                while parents[n] != n:
                    reconst_path.append(n)
                    n = parents[n]
                reconst_path.append(start_node)
                reconst_path.reverse()
                print('Path found: {}'.format(reconst_path))
                return reconst_path

            for (m, weight) in self.get_neighbors(n):
                if m not in open_list and m not in closed_list:
                    open_list.add(m)
                    parents[m] = n
                    g[m] = g[n] + weight
            else:
                if g[m] > g[n] + weight:
                    g[m] = g[n] + weight
                    parents[m] = n
                    if m in closed_list:
                        closed_list.remove(m)
                        open_list.add(m)
        open_list.remove(n)
        closed_list.add(n)
        print('Path does not exist!')
        return None

adjacency_list = {
'A': [('B', 1), ('C', 3), ('D', 7)],
'B': [('D', 5)],
'C': [('D', 12)]
}
graph1 = Graph(adjacency_list)
```

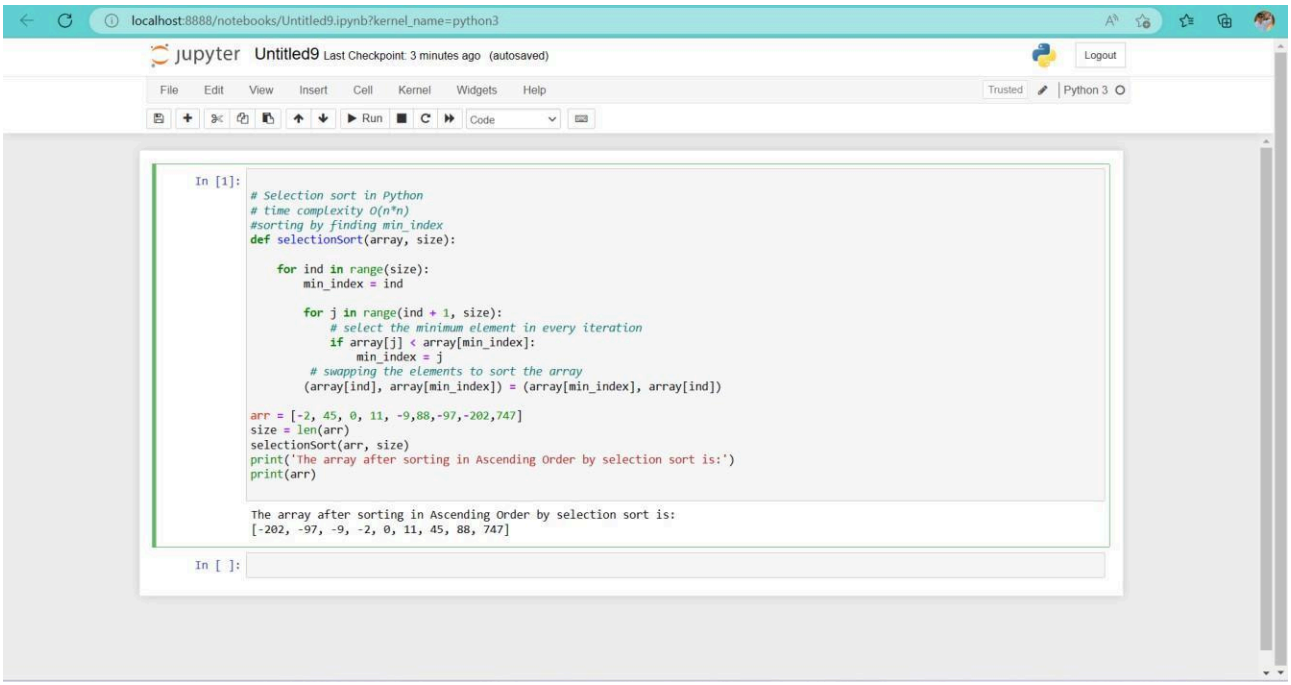
graph1.a_star_algorithm('A', 'D')



Name:-
Roll No.:-
Div:-

Title:- Implement Greedy search algorithm for selection sort
Program :-
Greedy search Algorithm for selection sort program

```
# Selection sort in Python
# time complexity O(n*n)
#sorting by finding min_index
def selectionSort(array, size):

    for ind in range(size):
        min_index = ind

        for j in range(ind + 1, size):

            # select the minimum element in every iteration
            if array[j] < array[min_index]:
                min_index = j

         # swapping the elements to sort the array

        (array[ind], array[min_index]) = (array[min_index], array[ind])

arr = [-2, 45, 0, 11, -9,88,-97,-202,747]

size = len(arr)
selectionSort(arr, size)
print('The array after sorting in Ascending Order by selection sort is:')


print(arr)
```


localhost:8888/notebooks/Untitled9.ipynb?kernel_name=python3
jupyter Untitled9 Last Checkpoint: 3 minutes ago (autosaved)
Logout
File Edit View Insert Cell Kernel Widgets Help
Trusted Python 3
Run Code
In [1]:
Selection sort in Python
time complexity O(n*n)
#sorting by finding min_index
def selectionSort(array, size):
for ind in range(size):
min_index = ind
for j in range(ind + 1, size):
# select the minimum element in every iteration
if array[j] < array[min_index]:
min_index = j
# swapping the elements to sort the array
(array[ind], array[min_index]) = (array[min_index], array[ind])
arr = [-2, 45, 0, 11, -9,88,-97,-202,747]
size = len(arr)
selectionSort(arr, size)
print('The array after sorting in Ascending Order by selection sort is:')
print(arr)
The array after sorting in Ascending Order by selection sort is:
[-202, -97, -9, -2, 0, 11, 45, 88, 747]
In [ ]:

Name:-
Roll No.:-
Div:-

Title:- Implement a solution for a constraint satisfaction problem using branch and bound and bracktracking for n-queens problem or a graph coloring problem

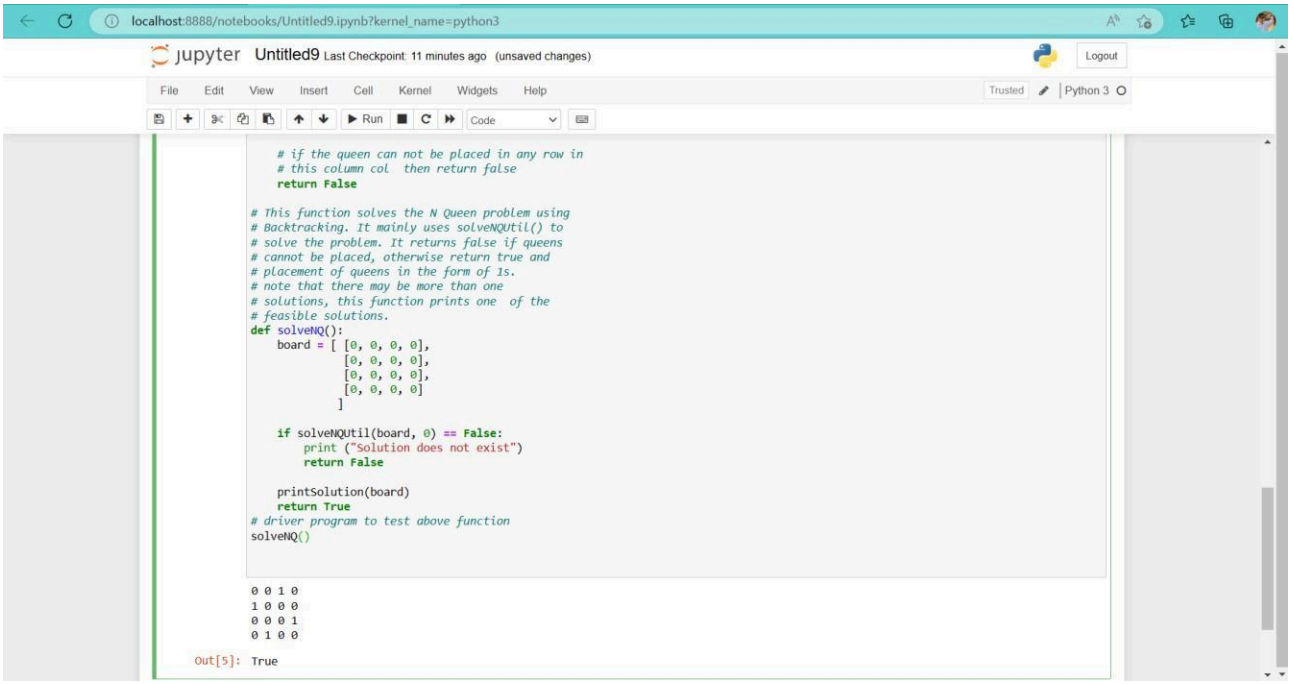
Program :-

n-queens problem

```
# Python program to solve N Queen
# Problem using backtracking

global N
N = 4

def printSolution(board):
    for i in range(N):
        for j in range(N):
            print (board[i][j],end=' ')
        print()


# A utility function to check if a queen can
# be placed on board[row][col]. Note that this
# function is called when "col" queens are
# already placed in columns from 0 to col -1.
# So we need to check only left side for
# attacking queens

def isSafe(board, row, col):

    # Check this row on left side
    for i in range(col):
        if board[row][i] == 1:
            return False

    # Check upper diagonal on left side
```

```
    for i, j in zip(range(row, -1, -1), range(col, -1, -1)):
        if board[i][j] == 1:
            return False


    # Check lower diagonal on left side

    for i, j in zip(range(row, N, 1), range(col, -1, -1)):
        if board[i][j] == 1:
            return False

    return True

def solveNQUtil(board, col):

    # base case: If all queens are
    placed # then return true
    if col >= N:
        return True

    # Consider this column and try placing
    # this queen in all rows one by one
    for i in range(N):

        if isSafe(board, i, col):
            # Place this queen in board[i][col]
            board[i][col] = 1

            # recur to place rest of the queens

            if solveNQUtil(board, col + 1) == True:
                return True

            # If placing queen in board[i][col
            # doesn't lead to a solution, then
            # queen from board[i][col]
            board[i][col] = 0

    # if the queen can not be placed in any row in
    # this column col then return false
    return False

# This function solves the N Queen problem using
```

```
# Backtracking. It mainly uses solveNQUtil() to
# solve the problem. It returns false if queens
# cannot be placed, otherwise return true and
# placement of queens in the form of 1s.
# note that there may be more than one

# solutions, this function prints one of the
# feasible solutions.
def solveNQ():

    board = [ [0, 0, 0, 0],

              [0, 0, 0, 0],

              [0, 0, 0, 0],
              [0, 0, 0, 0]

             ]


    if solveNQUtil(board, 0) == False:
        print ("Solution does not exist")
        return False

    printSolution(board)
    return True
# driver program to test above function
solveNQ()
```



Name:-
Roll No.:-
Div:-

Title:- Develop an elementary chatbot for any suitable customer interaction application

Program :-
Chatbot Program

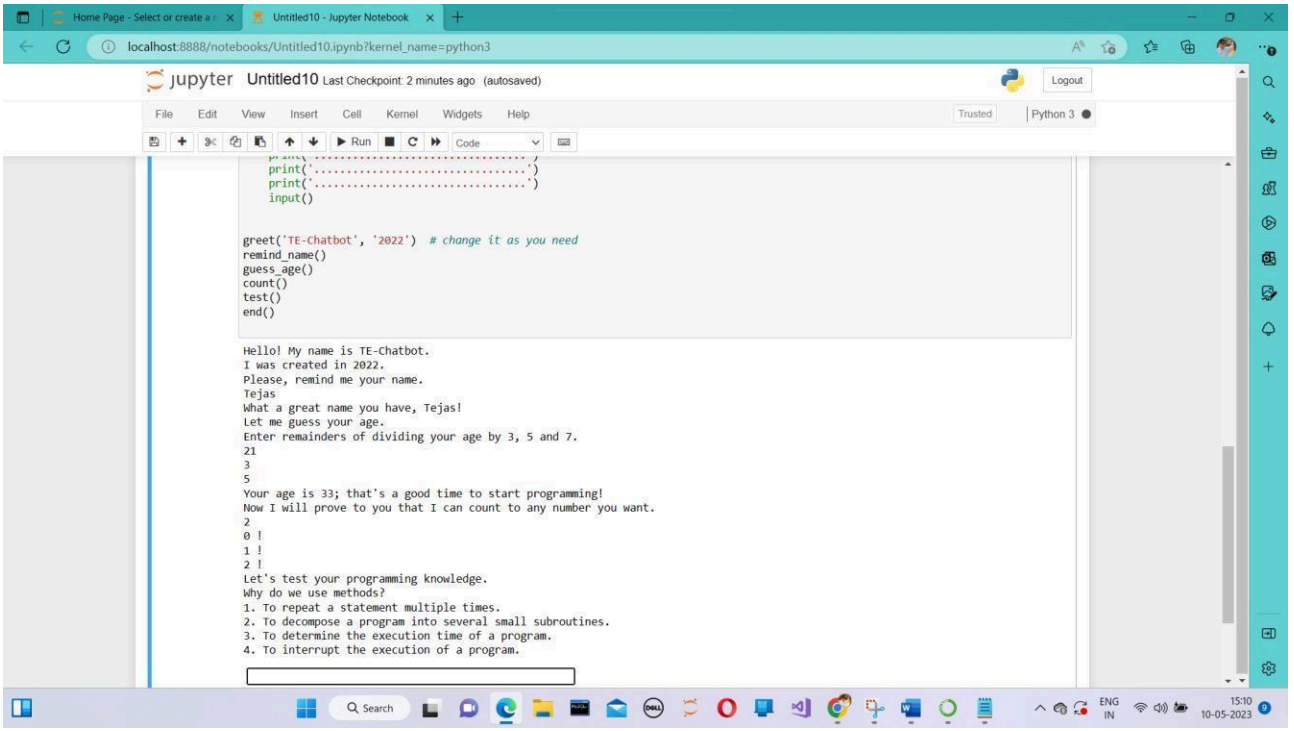
```
def greet(bot_name, birth_year):
    print("Hello! My name is {0}.".format(bot_name))
    print("I was created in {0}.".format(birth_year))


def remind_name():

    print('Please, remind me your name.')
    name = input()
    print("What a great name you have, {0}!".format(name))


def guess_age():

    print('Let me guess your age.')

    print('Enter remainders of dividing your age by 3, 5 and 7.')

    rem3                =
    int(input())    rem5
    =          int(input())
    rem7                =
    int(input())
    age = (rem3 * 70 + rem5 * 21 + rem7 * 15) % 105

    print("Your age is {0}; that's a good time to start
programming!".format(age))


def count():

    print('Now I will prove to you that I can count to any number you
```

```
want.')
    num = int(input())
```

```
    counter = 0

    while counter <= num:
        print("{0} !".format(counter))
        counter += 1


def test():

    print("Let's test your programming knowledge.")
    print("Why do we use methods?")
    print("1. To repeat a statement multiple times.")
    print("2. To decompose a program into several small
    subroutines.") print("3. To determine the execution time of a
    program.")
    print("4. To interrupt the execution of a program.")

    answer = 2
    guess = int(input())
    while guess != answer:
        print("Please, try again.")
        guess = int(input())

    print('Completed, have a nice
    day!') print('.                  ')
    print('.                  ')

    print('.                  ')


def end():

    print('Congratulations, have a nice
    day!') print('.                  ')
    print('.                  ')

    print('.                  ')

    input()


greet('TE-Chatbot', '2022') # change it as you need
remind_name()
```

guess_age()
count()

test()
end()


Home Page - Select or create a
Untitled10 - Jupyter Notebook
localhost:8888/notebooks/Untitled10.ipynb?kernel_name=python3
jupyter Untitled10 Last Checkpoint: 2 minutes ago (autosaved)
Logout
File Edit View Insert Cell Kernel Widgets Help
Trusted
Python 3
Run
Code
print('.....')
print('.....')
print('.....')
input()
greet('TE-Chatbot', '2022') # change it as you need
remind_name()
guess_age()
count()
test()
end()
Hello! My name is TE-Chatbot.
I was created in 2022.
Please, remind me your name.
Tejas
What a great name you have, Tejas!
Let me guess your age.
Enter remainders of dividing your age by 3, 5 and 7.
21
3
5
Your age is 33; that's a good time to start programming!
Now I will prove to you that I can count to any number you want.
2
0 !
1 !
2 !
Let's test your programming knowledge.
Why do we use methods?
1. To repeat a statement multiple times.
2. To decompose a program into several small subroutines.
3. To determine the execution time of a program.
4. To interrupt the execution of a program.
Search
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10-05-2023

Name:-
Roll No.:-
Div:-

Title:- Implement of Expert system Help Desk Management System
Program :-
Help Desk Management System

```
# Define a dictionary of common problems and their solutions
problem_dict = {
    "Printer not working": "Check that it's turned on and connected to the network",
    "Can't log in": "Make sure you're using the correct username and password",
    "Software not installing": "Check that your computer meets the system requirements",
    "Internet connection not working": "Restart your modem or router",
    "Email not sending": "Check that you're using the correct email server settings"

}

# Define a function to handle user requests
def handle_request(user_input):
    if user_input.lower() == "exit":
        return "Goodbye!"
    elif user_input in problem_dict:
        return problem_dict[user_input]
    else:
        return "I'm sorry, I don't know how to help with that problem."

# Main loop to prompt user for input
while True:
    user_input = input("What's the problem? Type 'exit' to quit. ")
    response = handle_request(user_input)
    print(response)
```

Output:-

```
What's the problem? Type 'exit' to quit. Printer not working
Check that it's turned on and connected to the network
What's the problem? Type 'exit' to quit. Can't log in
Make sure you're using the correct username and password
What's the problem? Type 'exit' to quit. Software not installing
Check that your computer meets the system requirements
What's the problem? Type 'exit' to quit. Internet connection not working
Restart your modem or router
What's the problem? Type 'exit' to quit. Email not sending
I'm sorry, I don't know how to help with that problem.
What's the problem? Type 'exit' to quit. exit
Goodbye!
What's the problem? Type 'exit' to quit.
```