

ML Assignment -2

- Dr. Amit Swamy

Team members:

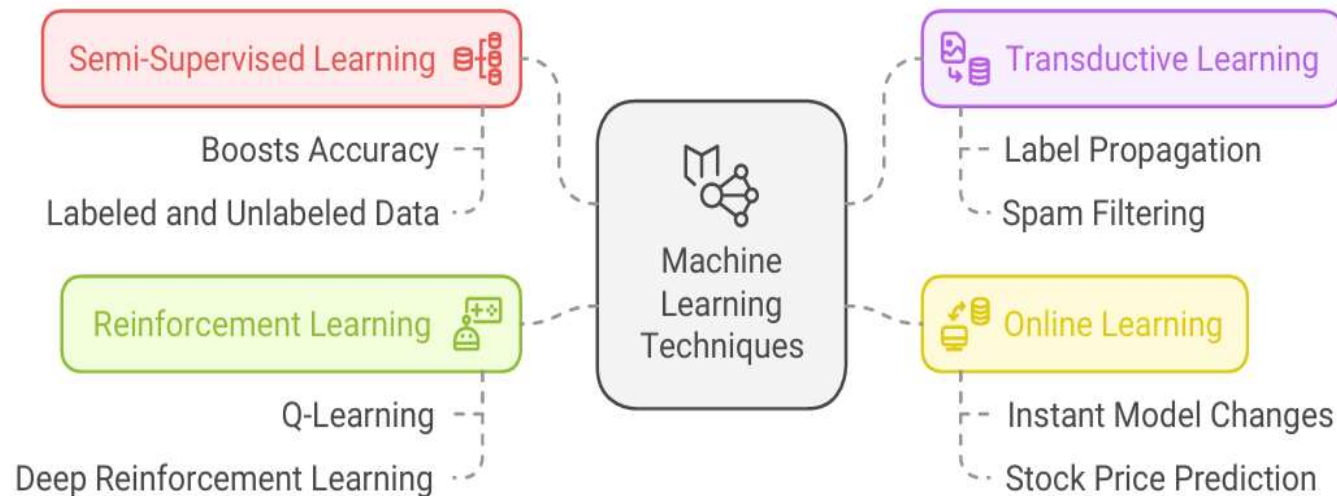
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Task - 1

Problem Statement:

Develop a Q-Learning agent to navigate a 4x4 Grid World and reach the goal at position (3,3) while learning an optimal policy. The agent will explore the environment, update Q-values, and improve decision-making over time?

Machine Learning Techniques and Their Applications



Input Information:

1. Environment
 - Grid: 4x4
 - Actions: Up, Down, Left, Right
 - Goal: (3, 3) (Reward = 1)

2. Parameters

- Learning Rate (alpha): 0.1
- Discount (gamma): 0.9
- Exploration (epsilon): 0.1

Output:

Example Q-values at state (3, 2):
[0.0, 0.9, 0.0, 1.0]

Meaning: Highest value (1.0) suggests moving right (action 3).

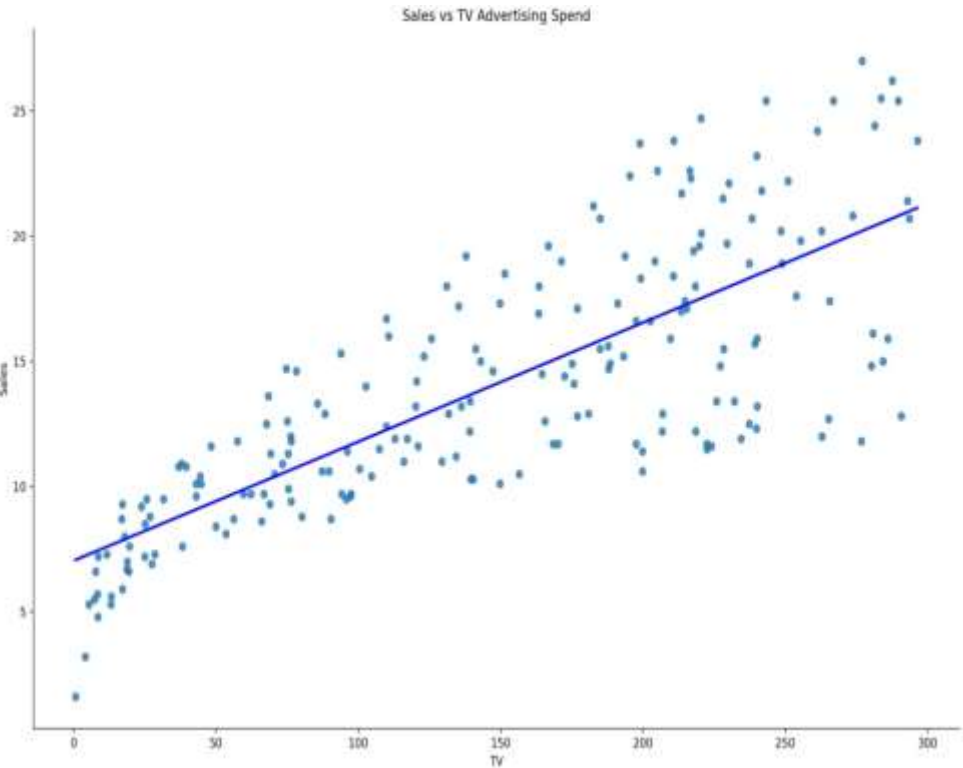
APA References:

Academic Papers & Books

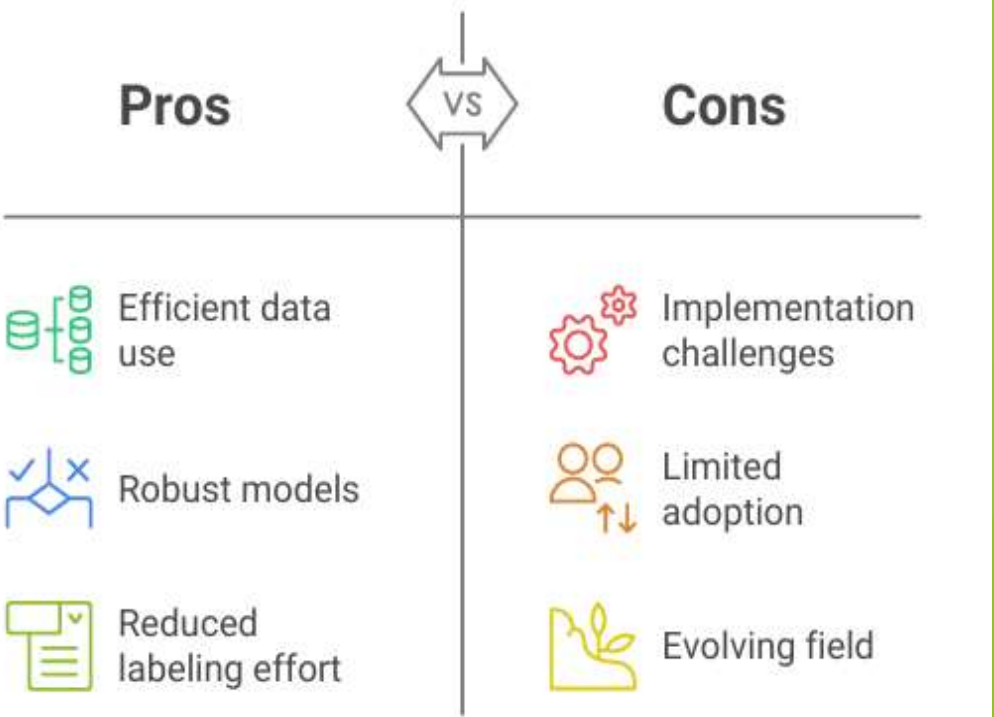
Watkins, C. J. C. H., & Dayan, P. (1992). Q-learning. Machine Learning, 8(3-4), 279-292.

OUTPUT:

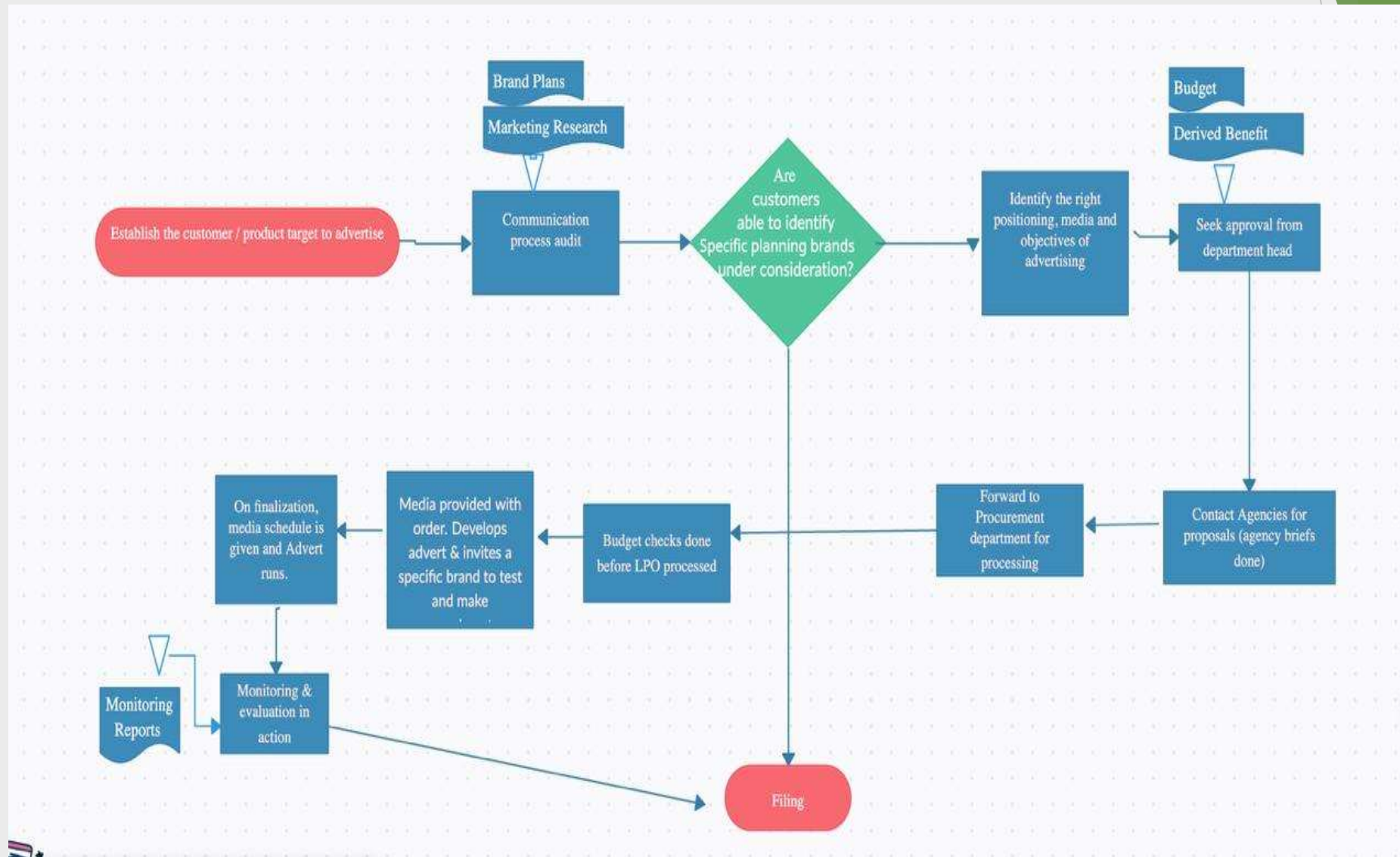
```
/Users/namburunainavismi/anaconda3/bin/python /Users/namburunainavismi/Desktop/Sen4/ML/GP-Task2.py
/Users/namburunainavismi/.zshrc:export:3: not valid in this context: /opt/homebrew/bin: /Library/Frameworks/Python.framework/Versions/3.12/bin:/Library/Frameworks/Python.framework/Versions/3.11/bin
:/usr/local/bin:/System/Cryptexes/App/usr/bin:/usr/bin:/bin:/usr/sbin:/sbin:/var/run/com.apple.security.cryptexd/codex.system/bootstrap/usr/local/bin:/var/run/com.apple.security.cryptexd/codex.system
n/bootstrap/usr/bin:/var/run/com.apple.security.cryptexd/codex.system/bootstrap/usr/appleinternal/bin:/opt/X11/bin:/Users/namburunainavismi/Library/Java/JavaVirtualMachines/openjdk-22/Contents/Home/
bin
namburunainavismi@Vismis-Macbook-Air % /Users/namburunainavismi/anaconda3/bin/python /Users/namburunainavismi/Desktop/Sen4/ML/GP-Task2.py
Unnamed: 0    TV    Radio    Newspaper    Sales
0         1  230.1   37.8      69.2    22.1
1         2   44.5   39.3      45.1    10.4
2         3   17.2   45.9      69.3     9.3
3         4  151.5   41.3      58.5    18.5
4         5  189.8   10.8      58.4    12.9
Unnamed: 0    0
TV            0
Radio        0
Newspaper    0
Sales        0
dtype: int64
```



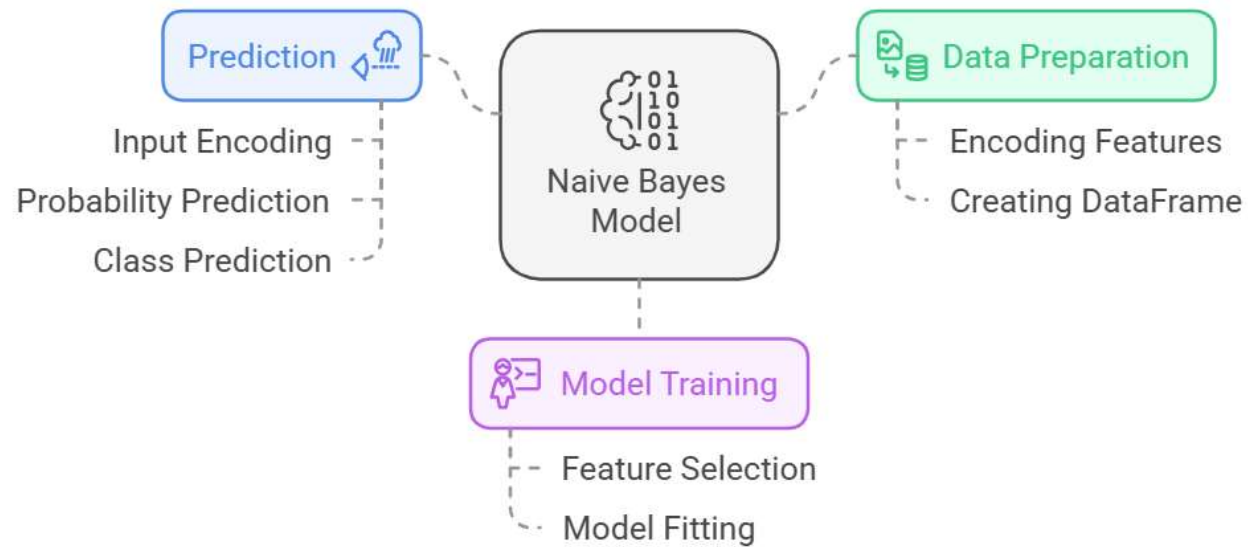
Task - 2



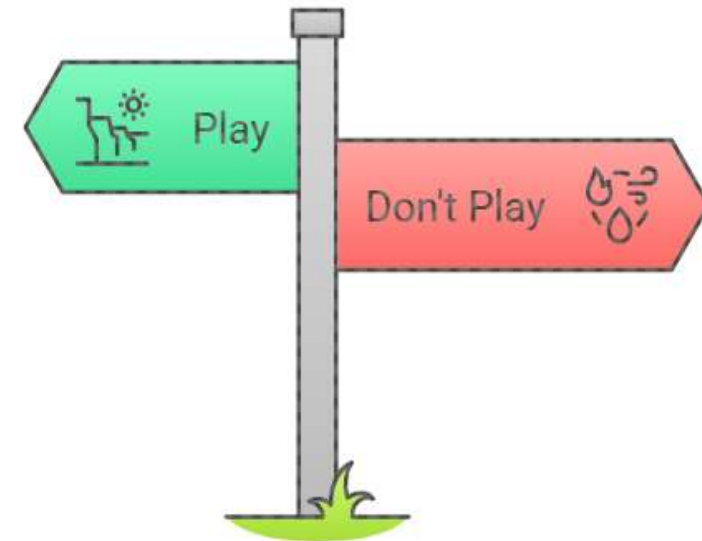
FLOW CHART:



Weather-Based Prediction Model Using Naive Bayes

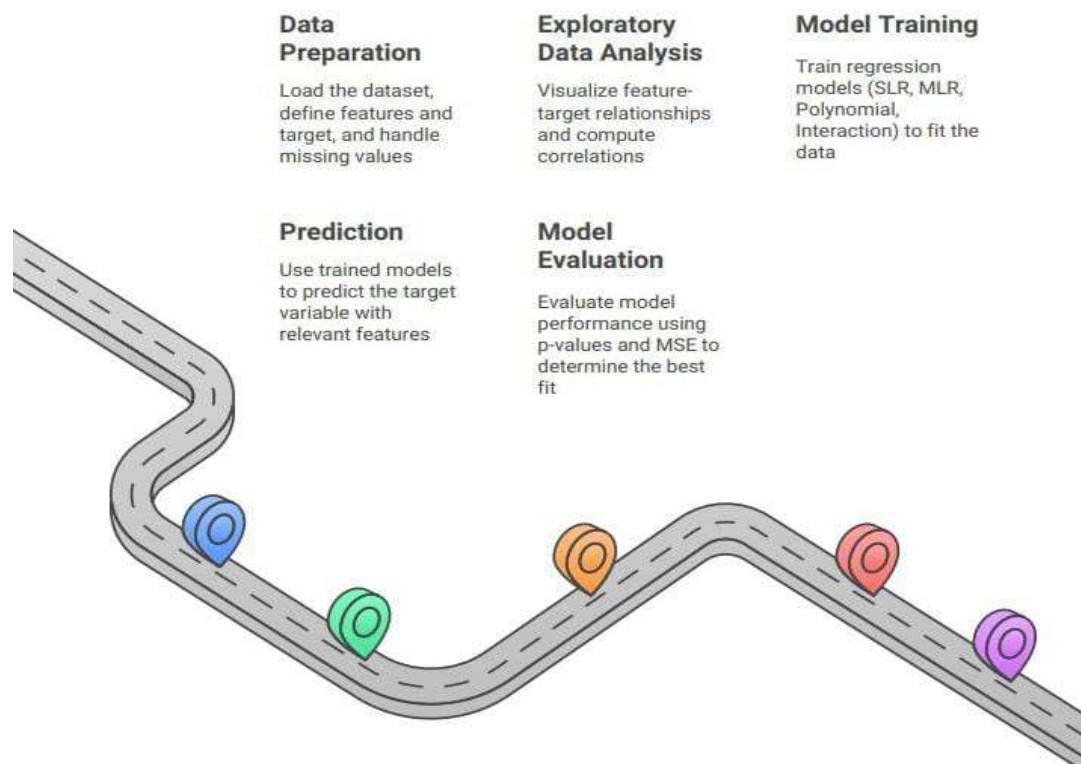


Should we play outside?

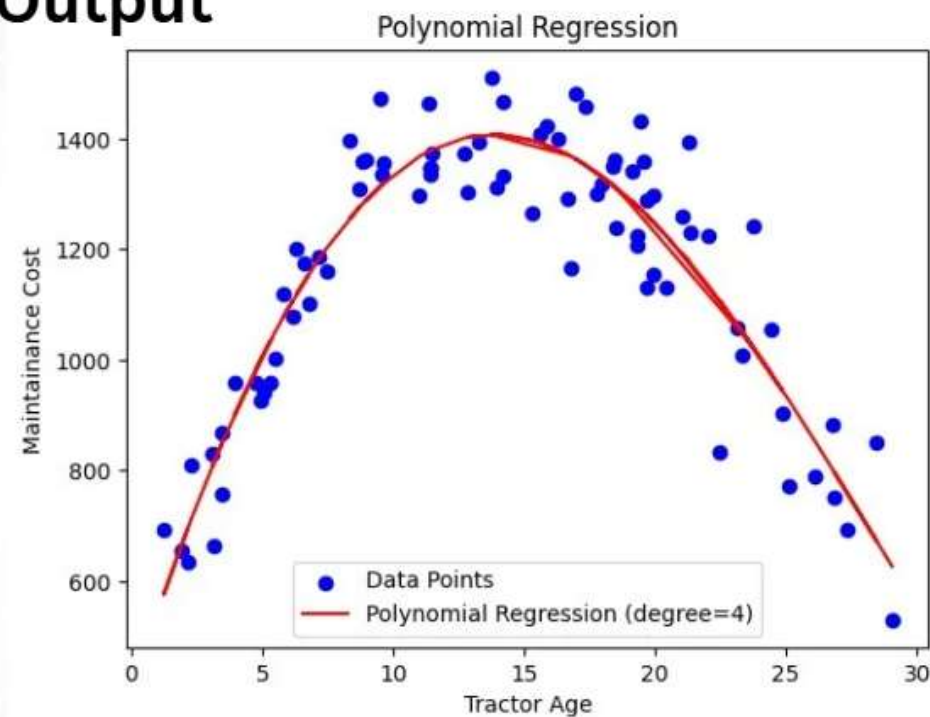
**RESULT:**

```
PS C:\Users\N ABHI RAM RUSHI\OneDrive\Desktop\SONG> & "C:/Users/N ABHI RAM RUSHI/AppData/Local/Programs/Python/Python312/python.exe" "c:/Users/N ABHI RAM RUSHI/OneDrive/Desktop/SONG/ml.py"
Prediction Probability: [[0.73580953 0.26419047]]
Prediction (0: No, 1: Yes): 0
PS C:\Users\N ABHI RAM RUSHI\OneDrive\Desktop\SONG>
```


TASK - 4



Output



Thank you

