Department of Electronics and Communication Engineering

MATLAB Hackathon Report

Team ID: MH11

Team Name: Tesseract

Team Member 1 (Leader): Priyam Jvalantkumar Sheth, L.D. College Of Engineering, Ahmedabad, Gujarat

Team Member 2: Harsh Ketan Shah, Gandhinagar Institute of Technology, Gandhinagar, Gujarat

Team Member 3: Darshil Ashish Shah, Nirma Institute of Technology, Ahmedabad, Gujarat

Problem Statement

Solve Them all :

1. Guessing Game
2. Screen Saver Bouncing Polygon
3. Polygon Drawer
4. Student Number Checker
5. Best Fit Regression

Approach

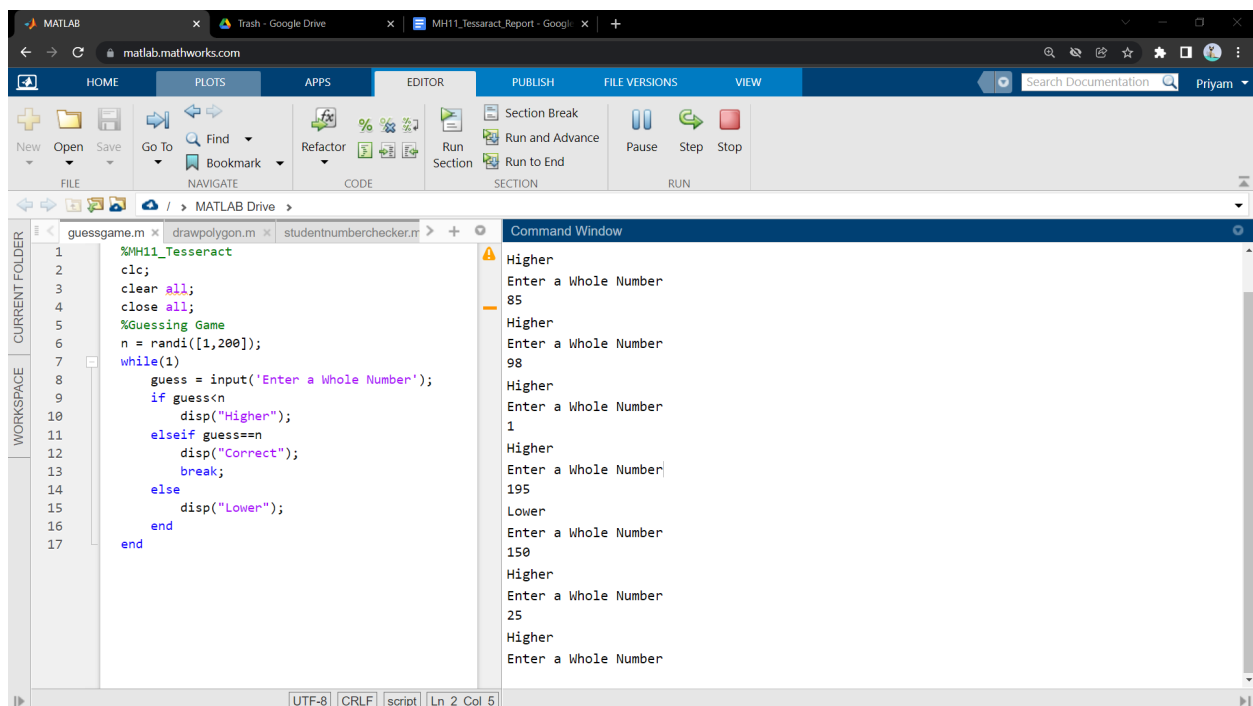Let us see the Approach of the Following Problems towards finding a Solution :

1. Guessing Game : We first find out how many variables will be required and after the we took a random values for computer input and for user input we gave another variable. After that we provided the required condition for getting the exact Output.
2. Screen Saver Bouncing Polygon : We took some reference from various website and with we found a way to show a polygon by declaring two variables and storing array in that and after that with plot function we had provided a polygon as Output.

3. Polygon Drawer : We have took the help of a tip which is given in problem statement and with that we have implemented the Polygon with the help of Ginput function.
4. Student Number Checker : This problem took a very long time as here have to act according to the condition given in the problem statement. Here we have declared a variable which the input from the user and that input is converted into string. After that with the help of slicing we slice the numbers and letters as required. With some Conditions, we have successfully implemented the given problem.
5. Best Fit Regression : We solve this problem with Least Square Method which a method to fit a Line on the basis of given point. We, first found the mean of X and Y and then we have found the slope and Y-Intercept. By equation $Y=mx + C$, we successfully implemented the Best Fit Regression Problem.

Simulation Results and Analysis

1. Guessing Game

Results :

2. Screen Saver Bouncing Polygon

Results :
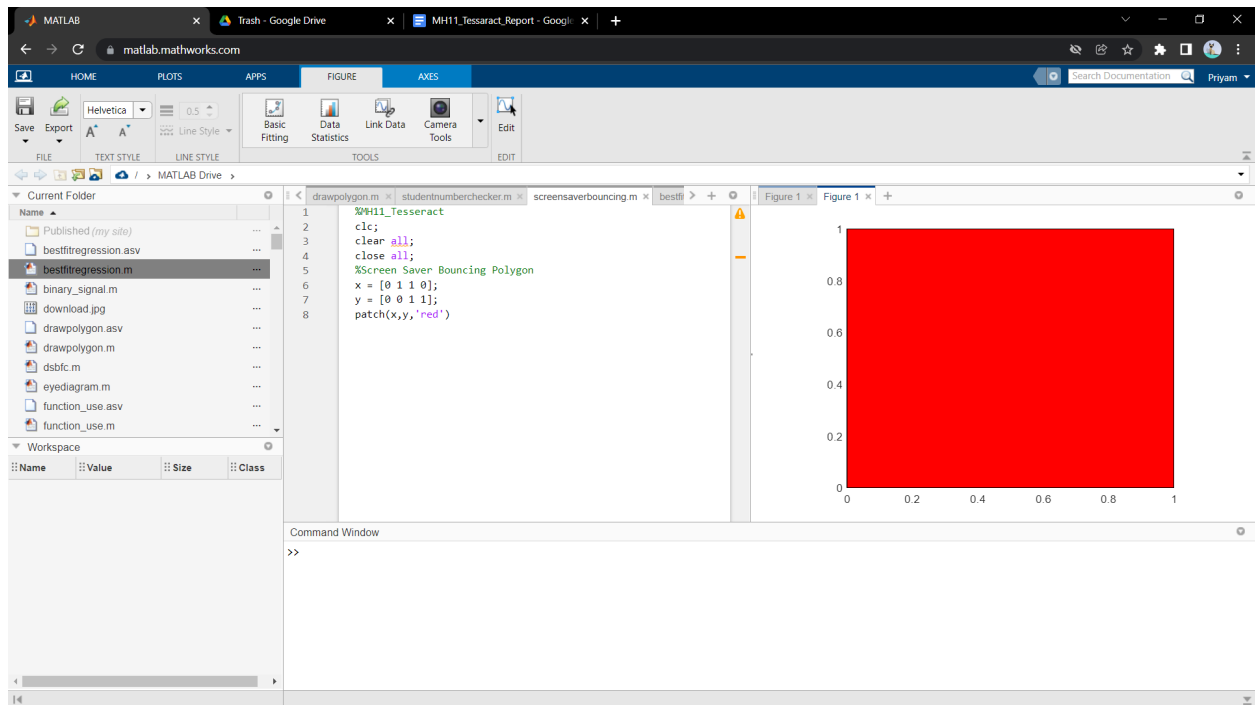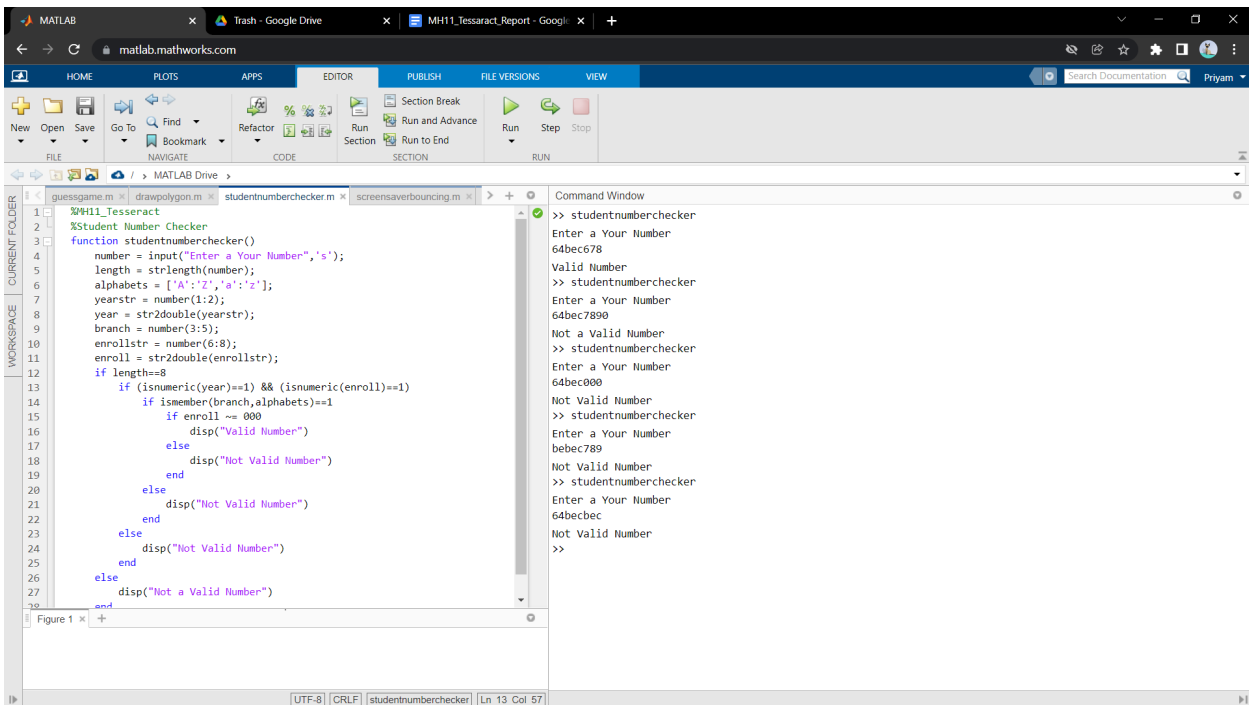
3. Polygon Drawer

Results :
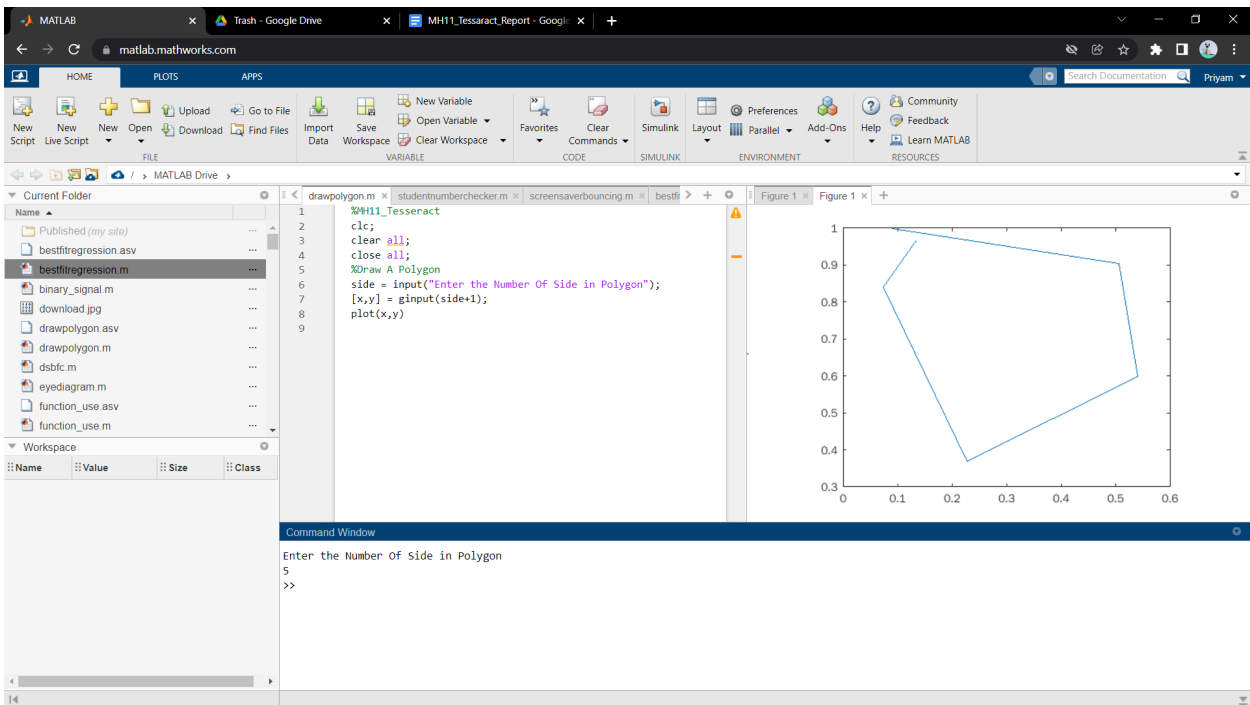
4. Student Number Checker
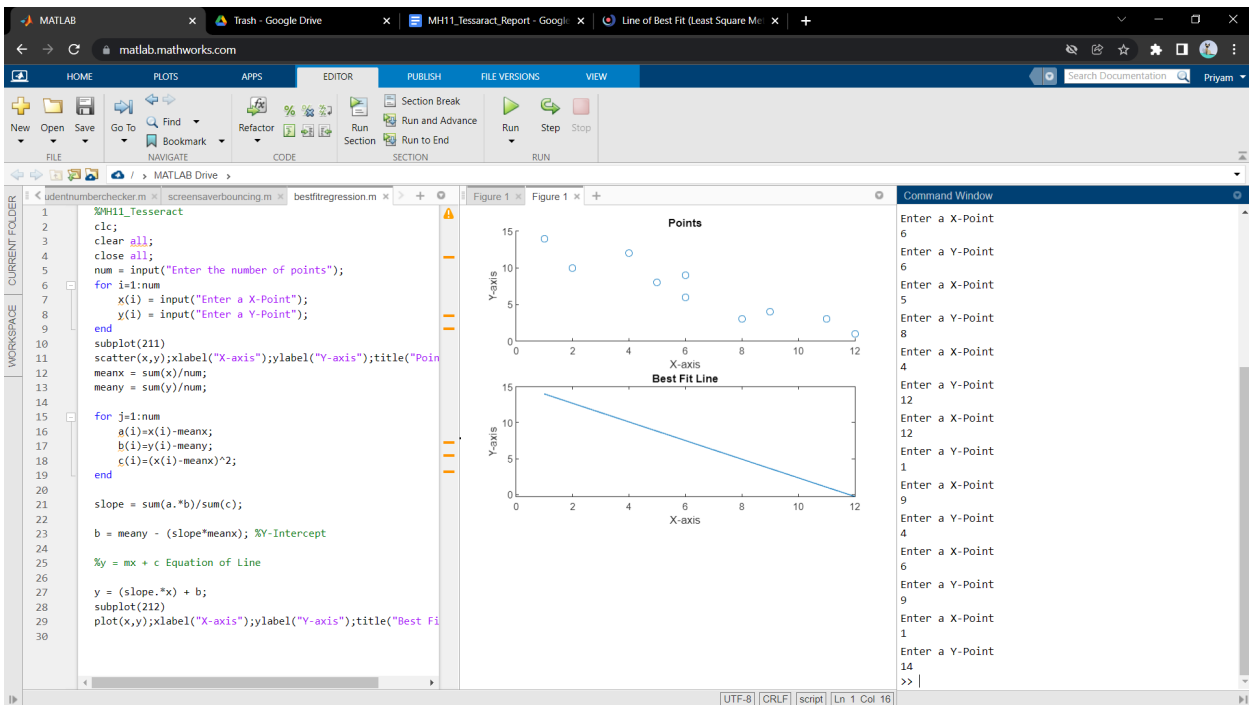
Results :


```matlab
%MH11_Tesseract
%Student Number Checker
function studentnumberchecker()
    number = input("Enter a Your Number",'s');
    length = strlength(number);
    alphabets = ['A':'Z','a':'z'];
    yearstr = number(1:2);
    year = str2double(yearstr);
    branch = number(3:5);
    enrollstr = number(6:8);
    enroll = str2double(enrollstr);
    if length==8
        if (isnumeric(year)==1) && (isnumeric(enroll)==1)
            if ismember(branch,alphabets)==1
                if enroll ~= 000
                    disp("Valid Number")
                else
                    disp("Not Valid Number")
                end
            else
                disp("Not Valid Number")
            end
        else
            disp("Not Valid Number")
        end
    else
        disp("Not a Valid Number")
    end
```

Command Window:
```
>> studentnumberchecker
Enter a Your Number
64bec678
Valid Number
>> studentnumberchecker
Enter a Your Number
64bec7890
Not a Valid Number
>> studentnumberchecker
Enter a Your Number
64bec000
Not Valid Number
>> studentnumberchecker
Enter a Your Number
bebec789
Not Valid Number
>> studentnumberchecker
Enter a Your Number
64becbec
Not Valid Number
>>
```

5. Best Fit Regression

Results :


```matlab
%MH11_Tesseract
clc;
clear all;
close all;
num = input("Enter the number of points");
for i=1:num
    x(i) = input("Enter a X-Point");
    y(i) = input("Enter a Y-Point");
end
subplot(211)
scatter(x,y);xlabel("X-axis");ylabel("Y-axis");title("Poin
meanx = sum(x)/num;
meany = sum(y)/num;

for j=1:num
    a(i)=x(i)-meanx;
    b(i)=y(i)-meany;
    c(i)=(x(i)-meanx)^2;
end

slope = sum(a.*b)/sum(c);

b = meany - (slope*meanx); %Y-Intercept

%y = mx + c Equation of Line

y = (slope.*x) + b;
subplot(212)
plot(x,y);xlabel("X-axis");ylabel("Y-axis");title("Best Fi
```

Command Window:
```
Enter a X-Point
6
Enter a Y-Point
6
Enter a X-Point
5
Enter a Y-Point
8
Enter a X-Point
4
Enter a Y-Point
12
Enter a X-Point
12
Enter a Y-Point
1
Enter a X-Point
9
Enter a Y-Point
12
Enter a X-Point
6
Enter a Y-Point
9
Enter a X-Point
1
Enter a Y-Point
14
>>
```

Concluding Remarks

We try to solve and execute the problem with the best of our knowledge.

Thank You for Giving us the opportunity.