EEE321

INTRODUCTION TO ALGORITHMS

MATLAB APP DESIGNER PROJECT REPORT

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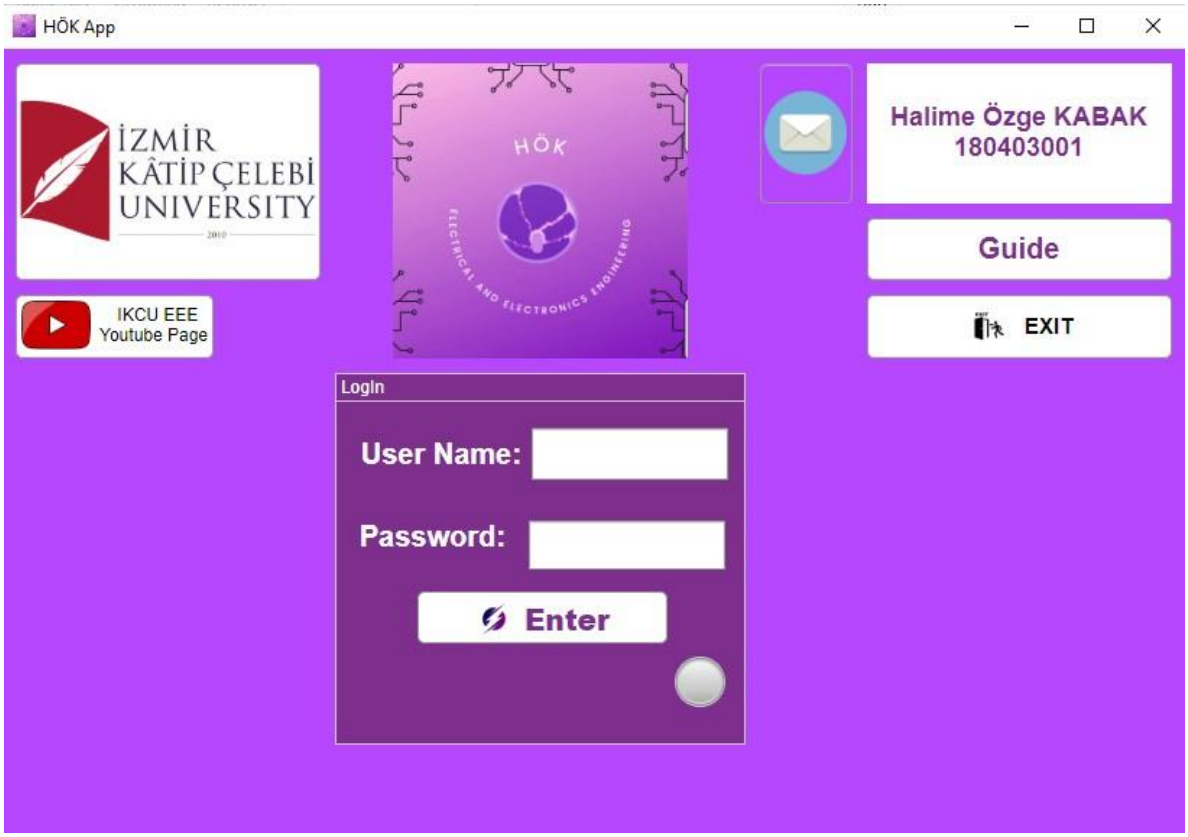
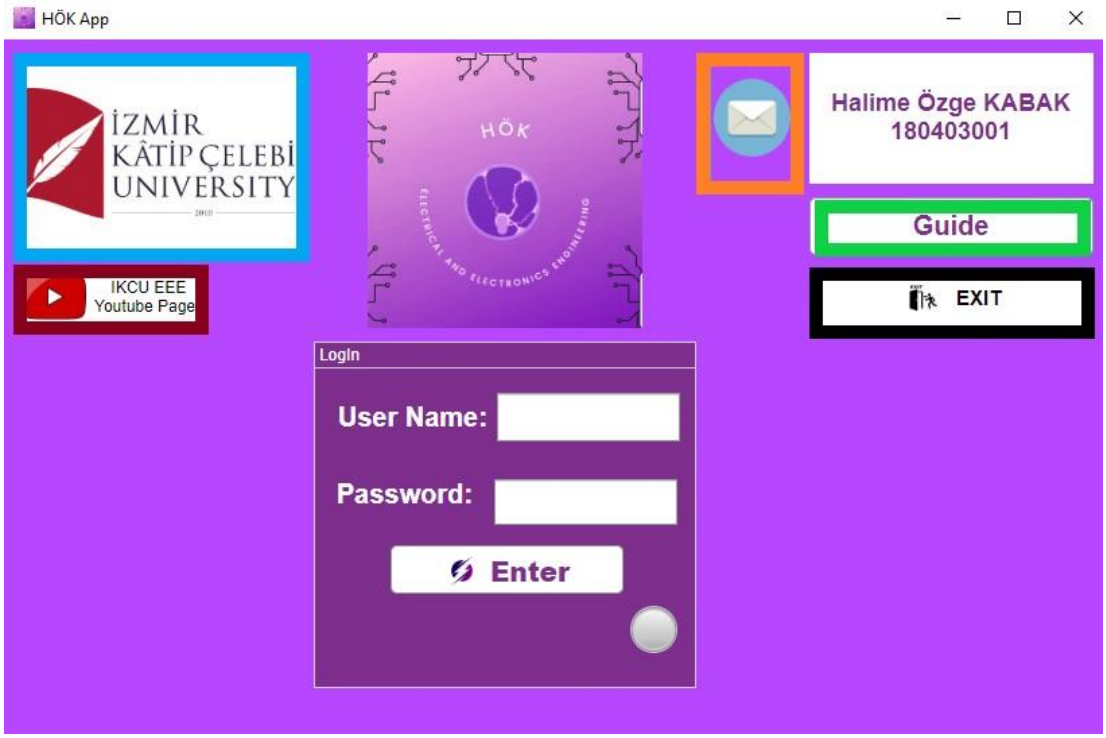
Log In Page:

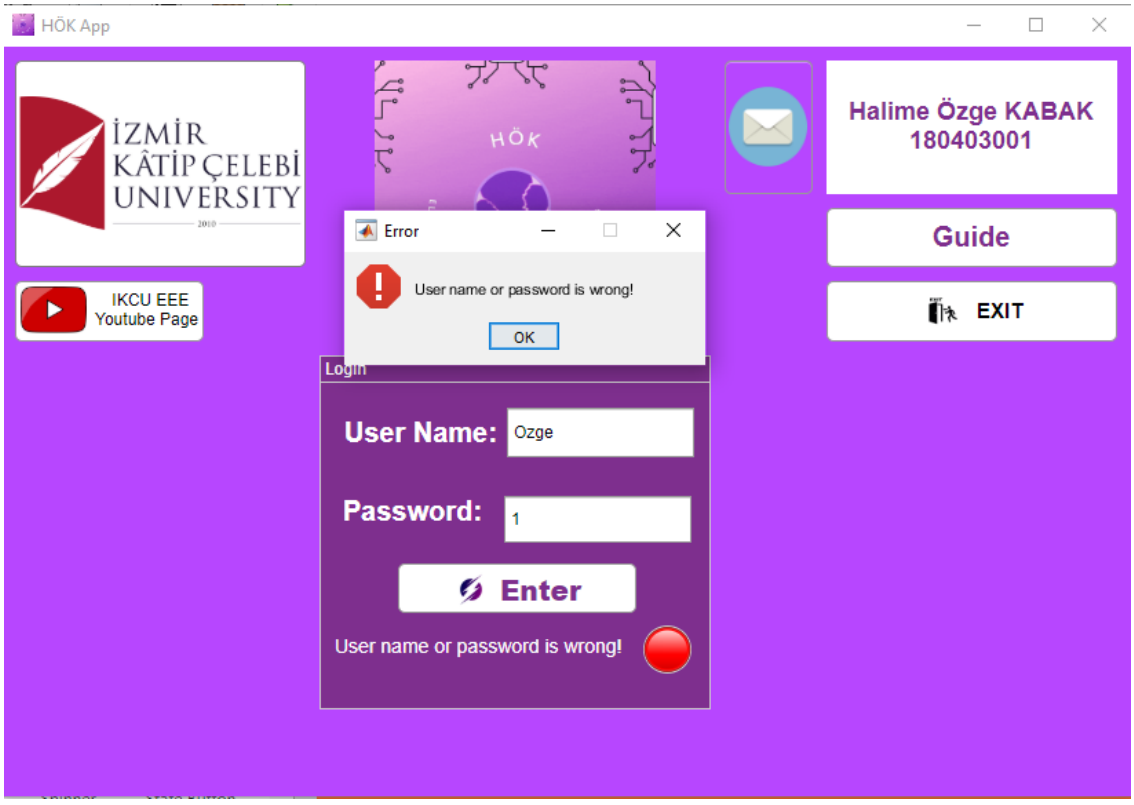


Buttons:

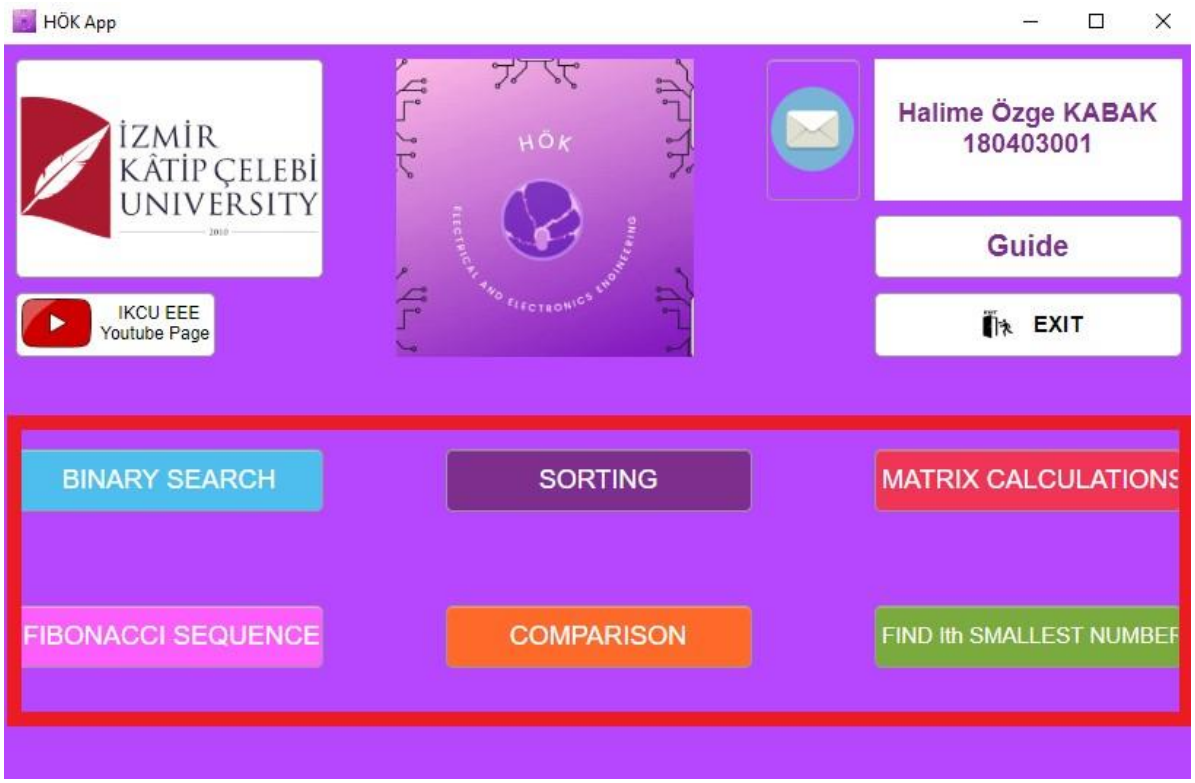
- Izmir Katip Celebi University Button: Thanks to this button, we can open the university's engineering website.
- IKCU EEE Youtube Page Button: When this button is pressed, the youtube page of the electrical and electronic engineering department of our university opens.
- Mail Icon Button: When this button is pressed, e-mail can be sent directly to me from user.
- Guide Button: When this button is pressed, a pdf page will open, this pdf page contains information on how to use this application.
- Exit Button: When this button is pressed, the login page closes and the exit page opens.



- Login Panel: "Ozge" as the user name and "12345" as the password must be entered on the panel. If the username or password is not correct, the lamp will turn red and the login will be unsuccessful. Then we will get an error message. If the password and user name are correct,the lamp will turn green and the login will be succesfull, the login panel will disappear and instead, buttons that allow us to access other pages will appear.

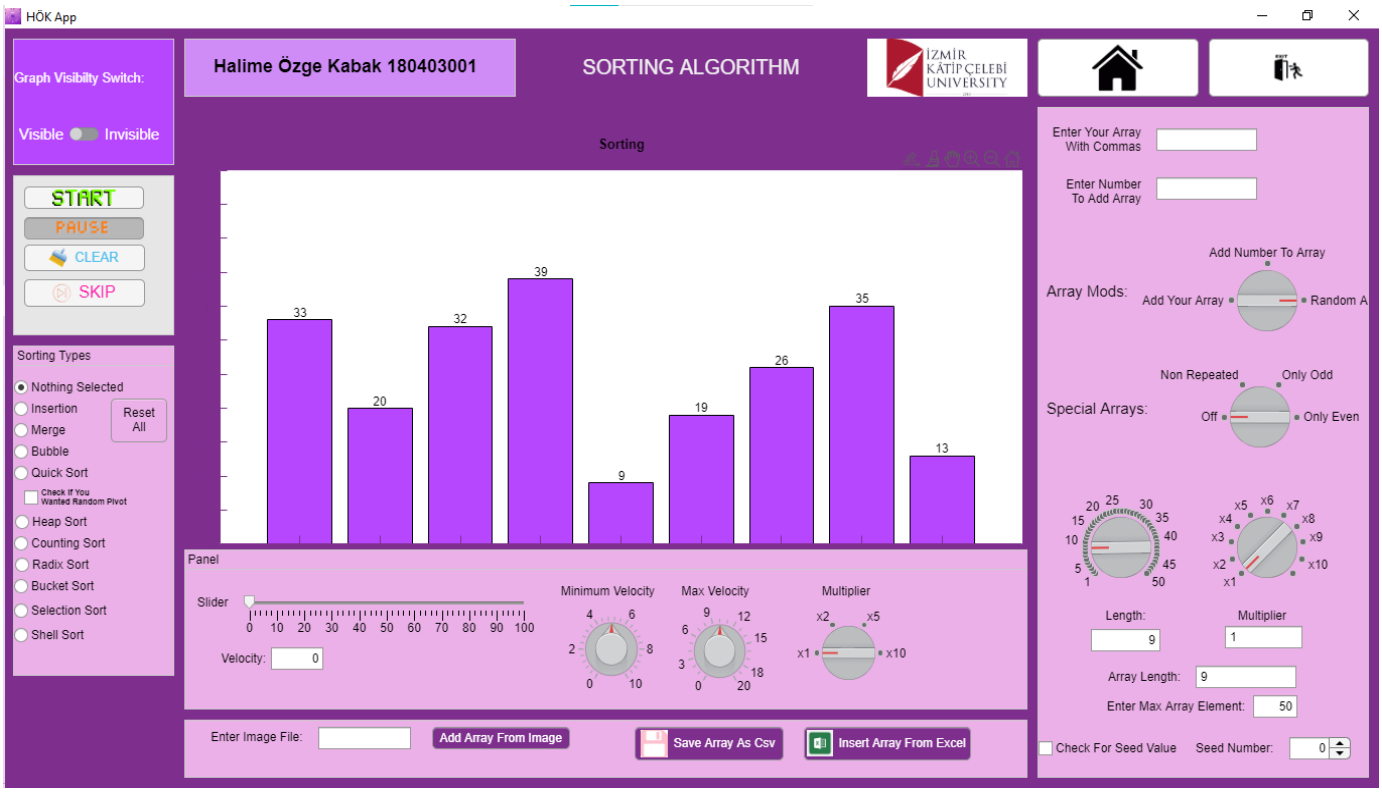


- Page Selection Buttons: Each of these buttons directs the user to the pages that perform the functions written on them.

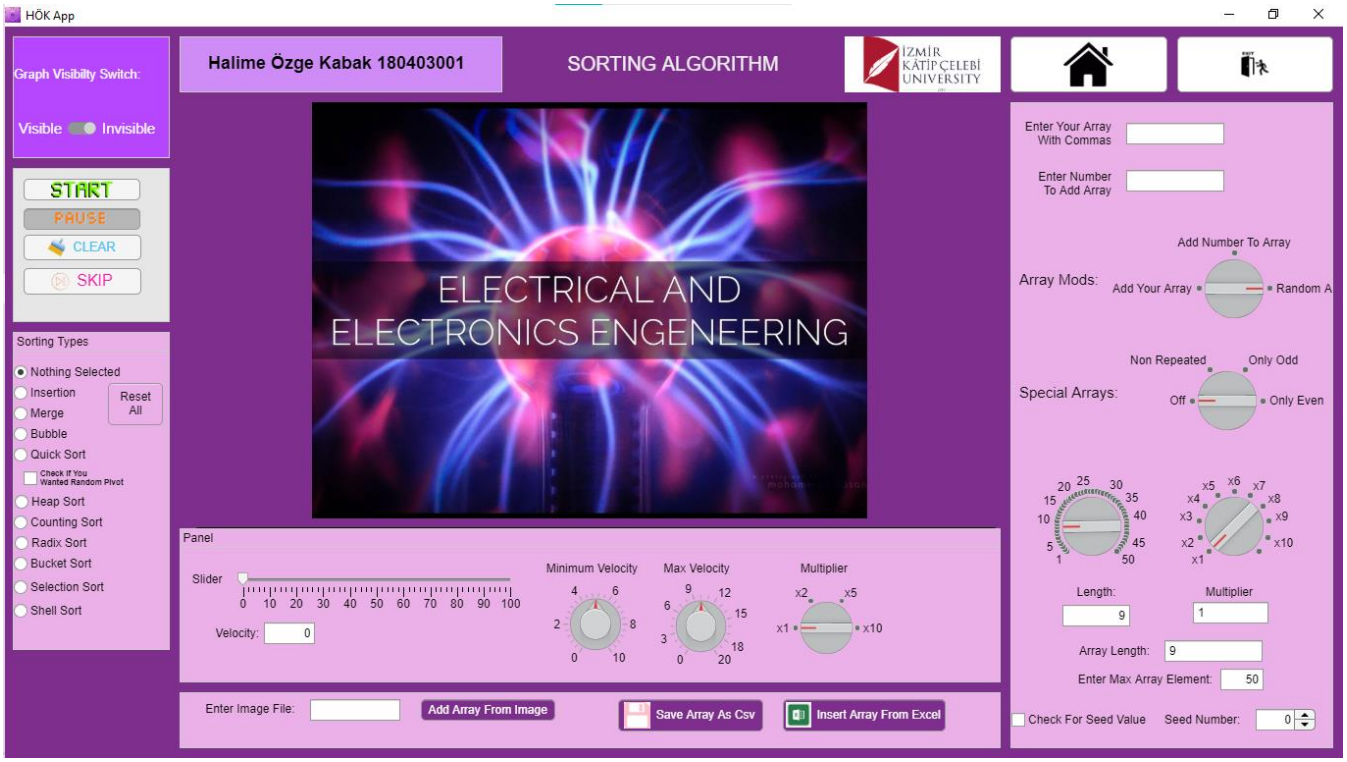


Sorting Page:

You can open this page with the "Sorting" button on the login page.



- **If you set the chart visibility switch to "visible", the chart will be visible, but if you set it to invisible, the chart will disappear and the image will appear instead.**

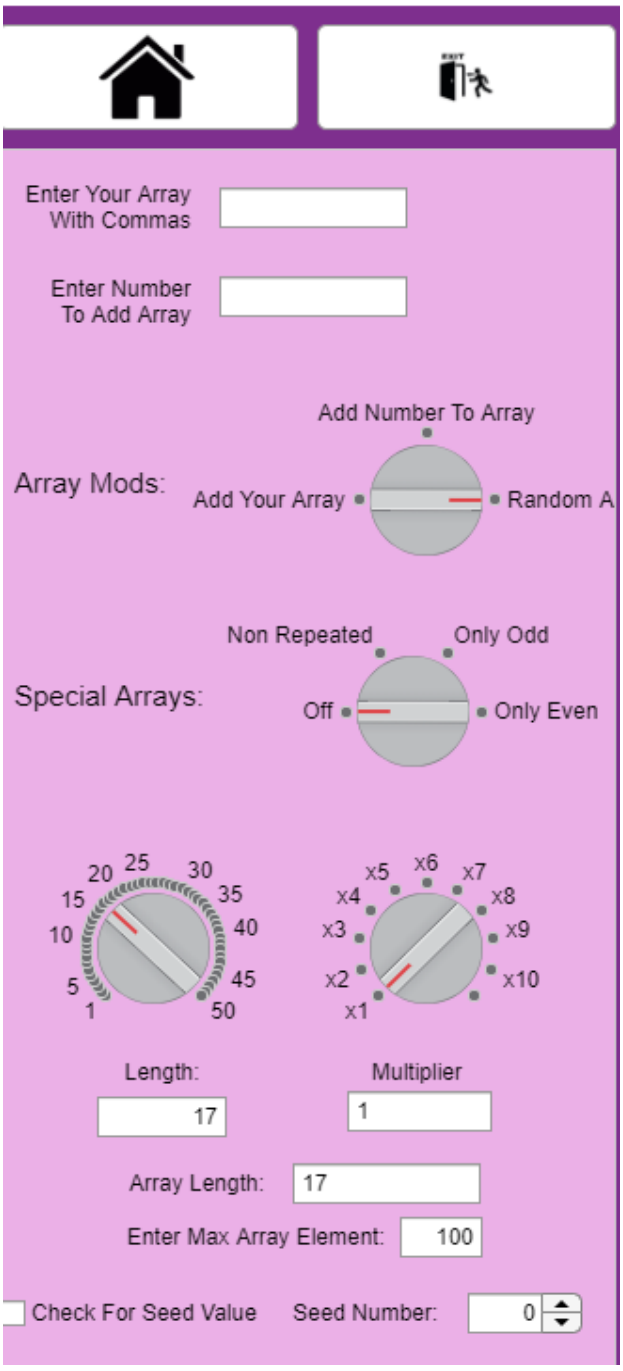


- **Thanks to the toggle button group, operations which are start,pause,clean and skip can be done easily while sorting process. When the "Start" button is pressed and sorting type is selected, sorting process will start. When the "Pause" button is pressed, sorting process will pause until it starts again. After it starts, it will resume to sorting process from where it remains. When the "Clean" button is pressed bar chart graph will be cleaned. Finally when the "Skip" button is pressed while sorting is processing, the sorted array will appear directly without showing the steps of the sorting process.**

- **Thanks to the radio button group, we select the sorting type we want and start the sorting process. At first, the "nothing selected" button will be selected, then the user will be able to choose what they want. When the sorting process starts, the remaining buttons will be inaccessible except for the selected button and the "nothing selected" button. With the "reset all" button we can reset all the buttons to their original settings. Every time sorting operation is ended , user must use "Reset All" button for choosing another sorting time. Also for the sorting process, the start button should always be selected first and then the sorting type should be selected, otherwise the sorting process will not start.**
- **Extra note: When quick sort is selected, if the check box is not checked, the quick sort operation will be done through a selected pivot by default, but if the checkbox is checked, a spinbox will appear and the pivot will be selected according to the number user has selected from here and the sorting process will continue.**

- **With this panel, we can adjust the speed of the sorting process. The speed adjustment is made from the slider, but the maximum and minimum speed limit settings of the slider are made with the help of the knobs next to it. With these knobs, minimum and maximum limits can be determined and these values can be increased by using the multiplier knob. Multiplier knob multiplies the values of other knobs and this determines the minimum and maximum limits of the slider. In the line edit at the bottom, we can see the value of the current speed of the slider.**

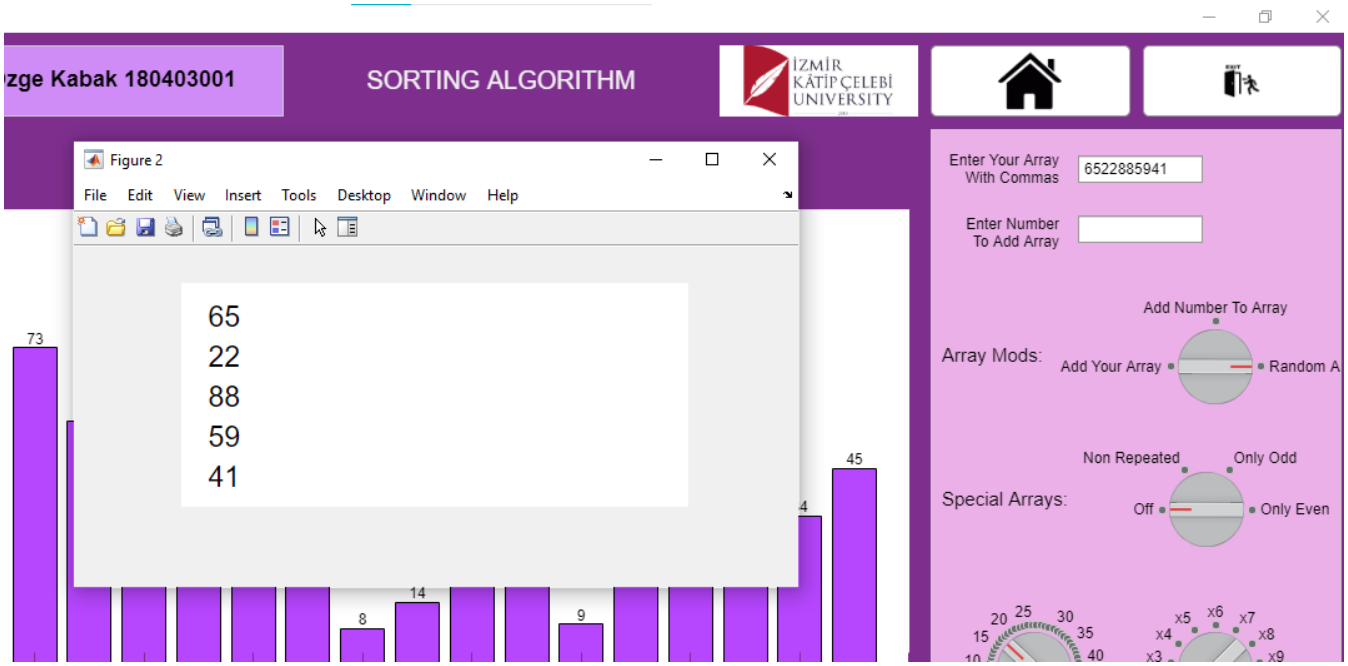
- **In this section, we can return to the login menu with the button with the house image in the upper right, if we press the exit button, the exit page opens and this page closes.**

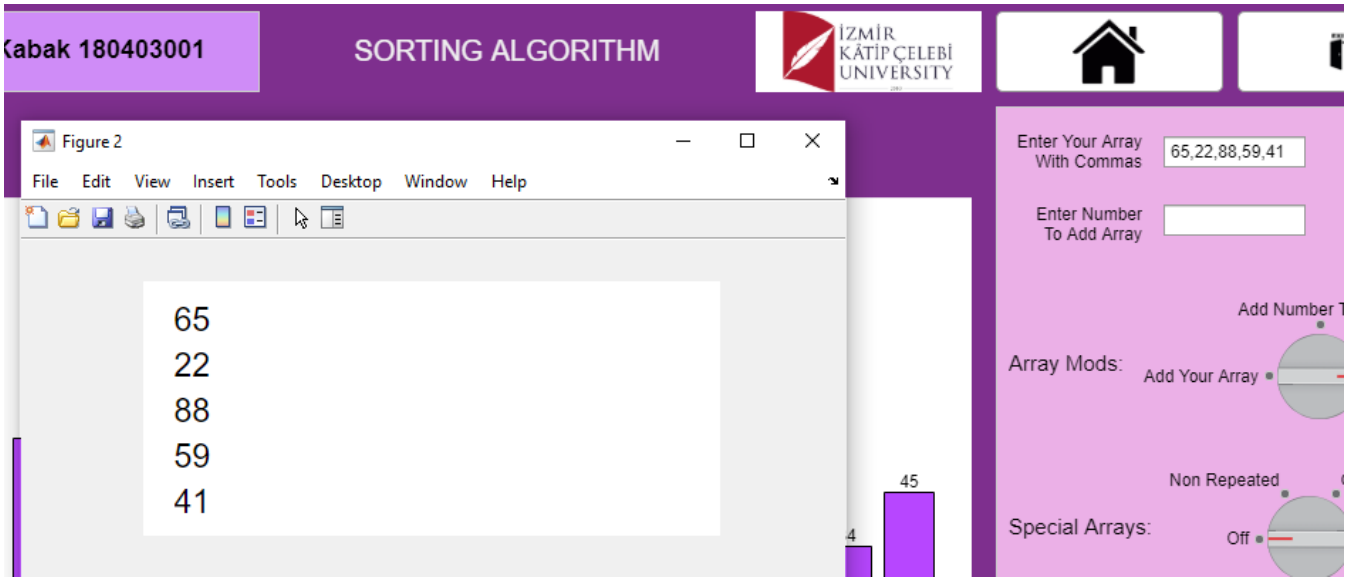


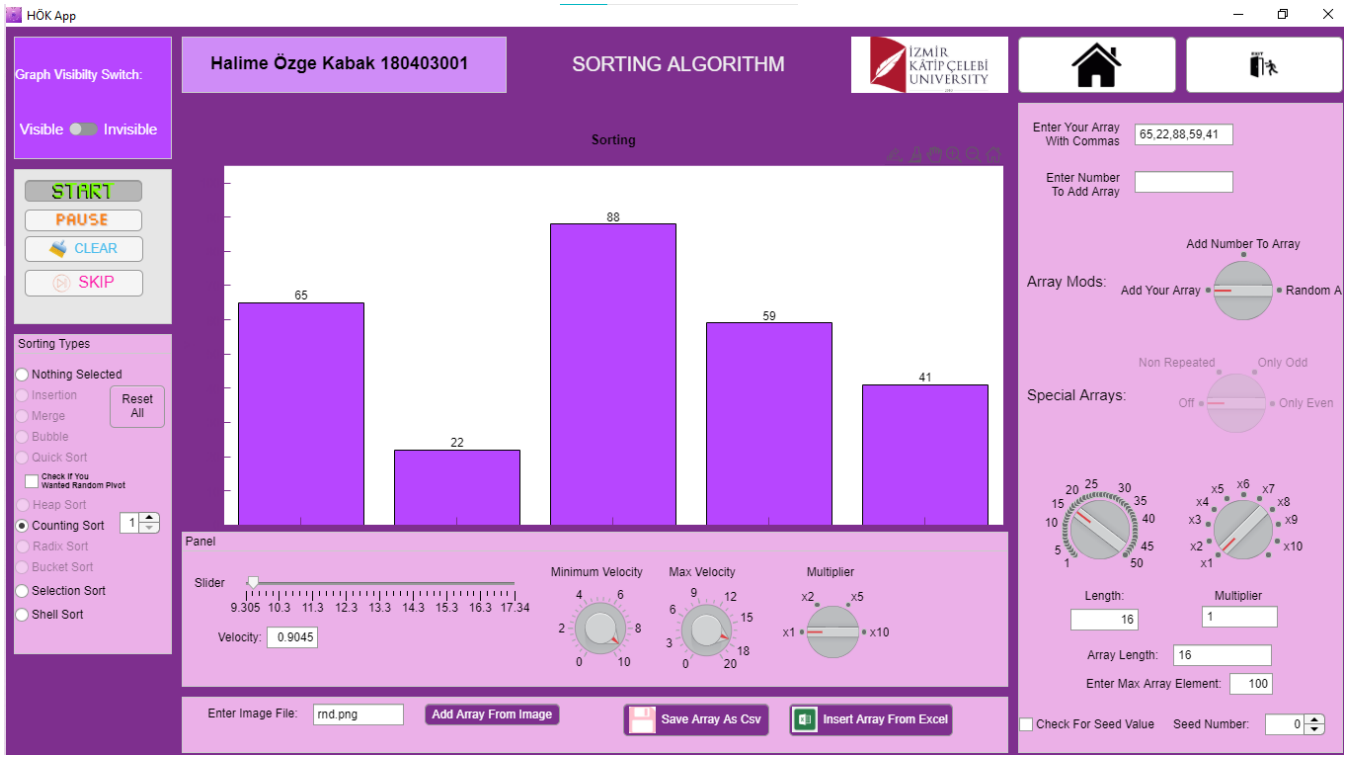
- **When starting the array mode, it stays in the random array option. In this option, we can determine the size of the array with the length knob and multiplier knob at the bottom without using the special array button. The size of the array is equal to the product of the value of the multiplier knob and the value of the length knob. Also, with the help of the line edit at the bottom, we can determine the maximum value that can be found in the array. If we write the numbers we want by putting a comma between them in the first line edit and then change the array mode to "add your own array" mode, we can create the array we want. If we enter a number in the second line edit and the array mode is set to "add your number" mode We can add this number as the last element of the random array.**
- **The special array knob is available when the array mode knob is in the random array option. If we select the "non-repeated" option, the array consists of non-repeating numbers, if we select the "only even" option, the array consists of only even numbers,if we select "only odd" option the array will consist of only odd numbers. The special array knob will be inaccessible when the array mode knob is in "add your own array" or "add number to array" modes.**

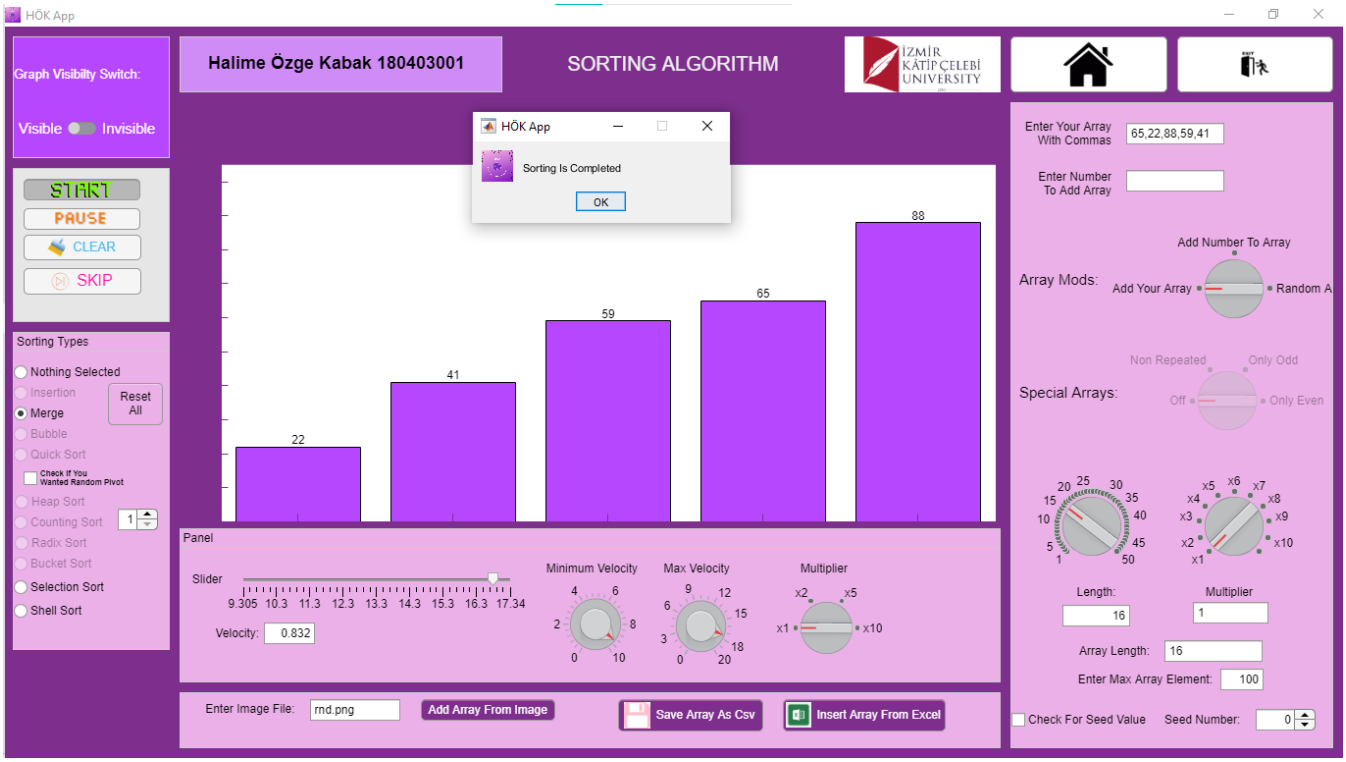
- **If the seed number checkbox is checked whatever the other options are, user will see nth seed array. This n number can be obtain from spinner.**

- **In this section, user can select an array from image. For using this feature, firstly user must write image file's name with its extension (jpg, jpeg , png). After the "Add Array From Image" button is pressed, image will be appear on the screen and the values on it will written to "Add Your Array" line edit. Finally user should add commas between the numbers and after that array will be seen on the bar chart. When the "Save Array As CVS" button is pressed, array on the chart will be save as csv file and when the "Insert Array From Excel" button is pressed, user can add array from excel file.**




Kabak 180403001
SORTING ALGORITHM
İZMİR KÂTİP ÇELEBİ UNIVERSITY
Figure 2
File Edit View Insert Tools Desktop Window Help
65
22
88
59
41
45
Enter Your Array With Commas
65,22,88,59,41
Enter Number To Add Array
Add Number T
Array Mods:
Add Your Array
Non Repeated
Special Arrays:
Off

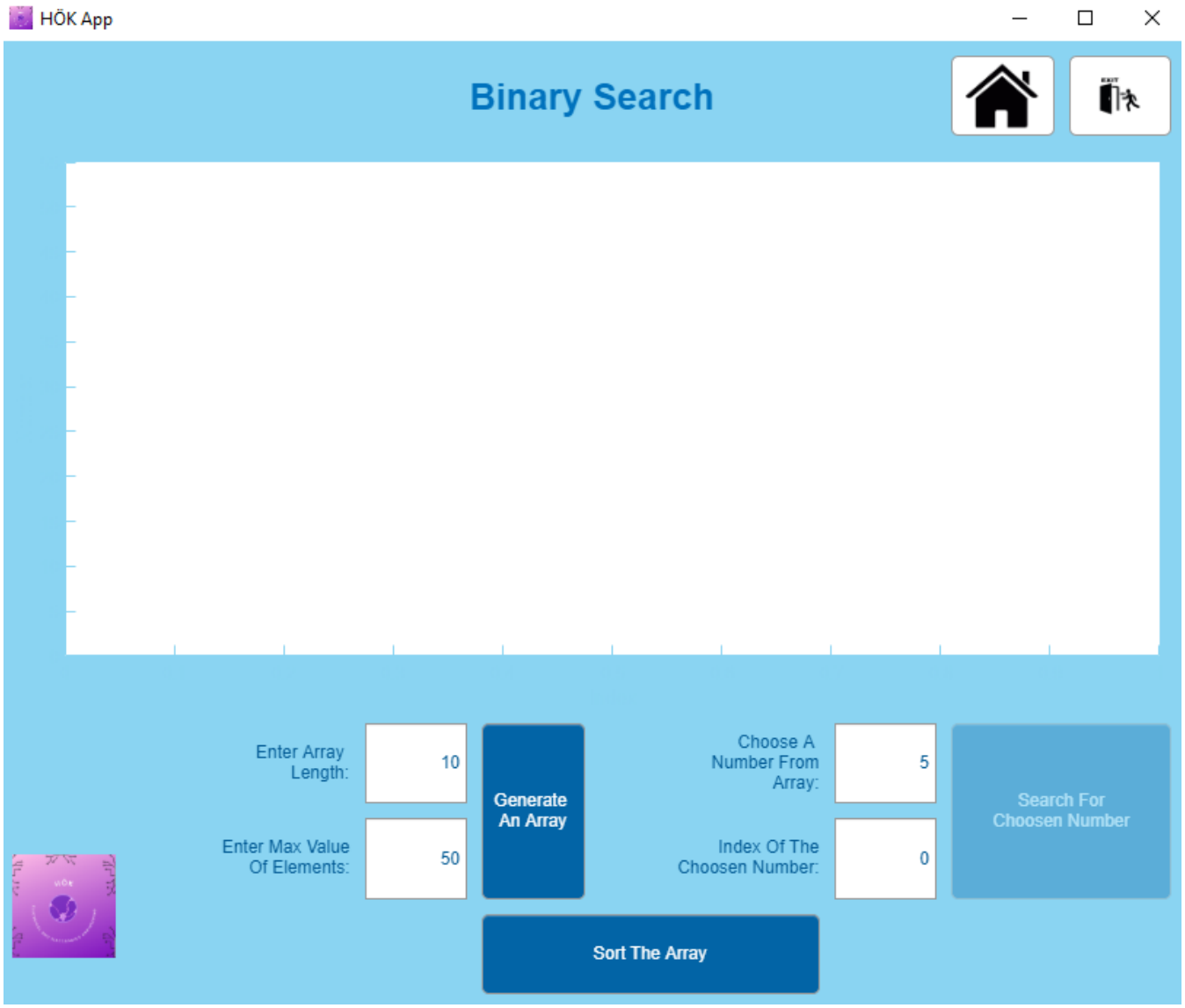

HÖK App
Graph Visibilty Switch:
Visible Invisible
Halime Özge Kabak 180403001
SORTING ALGORITHM
İZMİR KÂTİP ÇELEBİ UNIVERSITY
START
PAUSE
CLEAR
SKIP
Sorting
65
22
88
59
41
Sorting Types
Nothing Selected
Insertion
Merge
Bubble
Quick Sort
Reset All
Check If You Wanted Random Pivot
Heap Sort
Counting Sort
Radix Sort
Bucket Sort
Selection Sort
Shell Sort
Panel
Slider
9.305 10.3 11.3 12.3 13.3 14.3 15.3 16.3 17.34
Velocity: 0.9045
Minimum Velocity
Max Velocity
Multiplier
Enter Image File: rnd.png
Add Array From Image
Save Array As Csv
Insert Array From Excel
Enter Your Array With Commas
65,22,88,59,41
Enter Number To Add Array
Add Number To Array
Array Mods:
Add Your Array
Random A
Non Repeated
Only Odd
Special Arrays:
Off
Only Even
Length:
16
Multiplier
1
Array Length:
16
Enter Max Array Element:
100
Check For Seed Value
Seed Number:
0



- **At the end of the sorting process, a message box will appear and it will inform user about sorting is completed. Also an alarm sound will sound at the end of the sorting.**

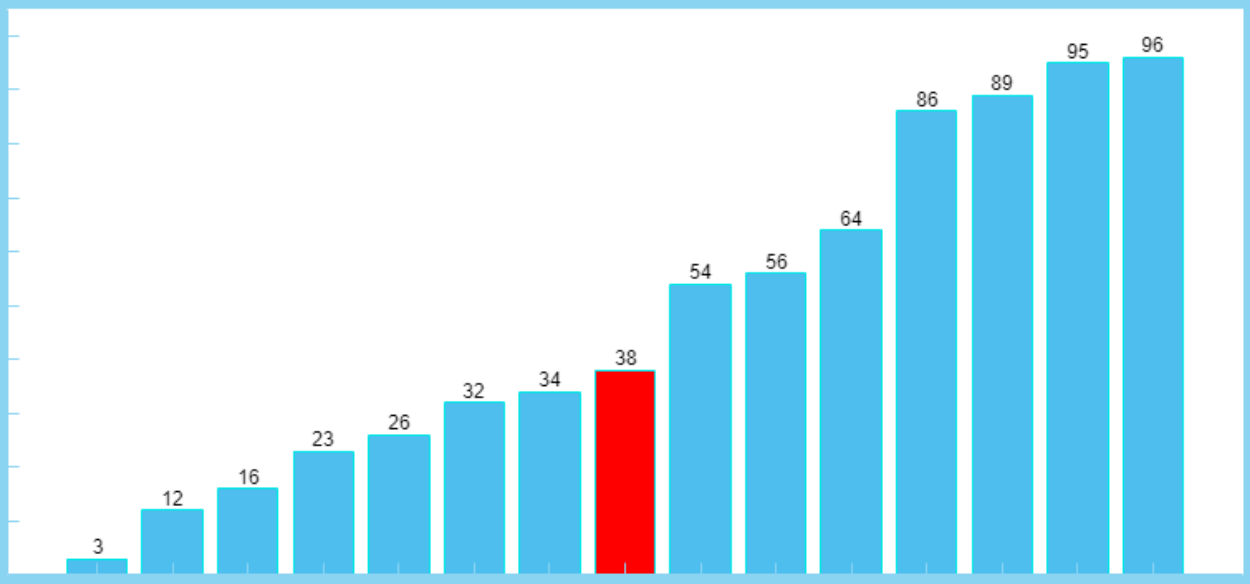
Binary Search Page:

We can access this page with the help of the "binary search" button on the login screen.



- **In this page , user can search a number in the array and find its index in the array. For this purpose first user must generate an array and then sort the array. If user will not sort the array , searching button will be not enable. After sorting array,user should write the number to be search then when the search button is pressed, numbers index will be appear on the line edit. If number is not in the array then error message will appear on the screen.**

Binary Search



Enter Array Length: 15

Enter Max Value Of Elements: 100

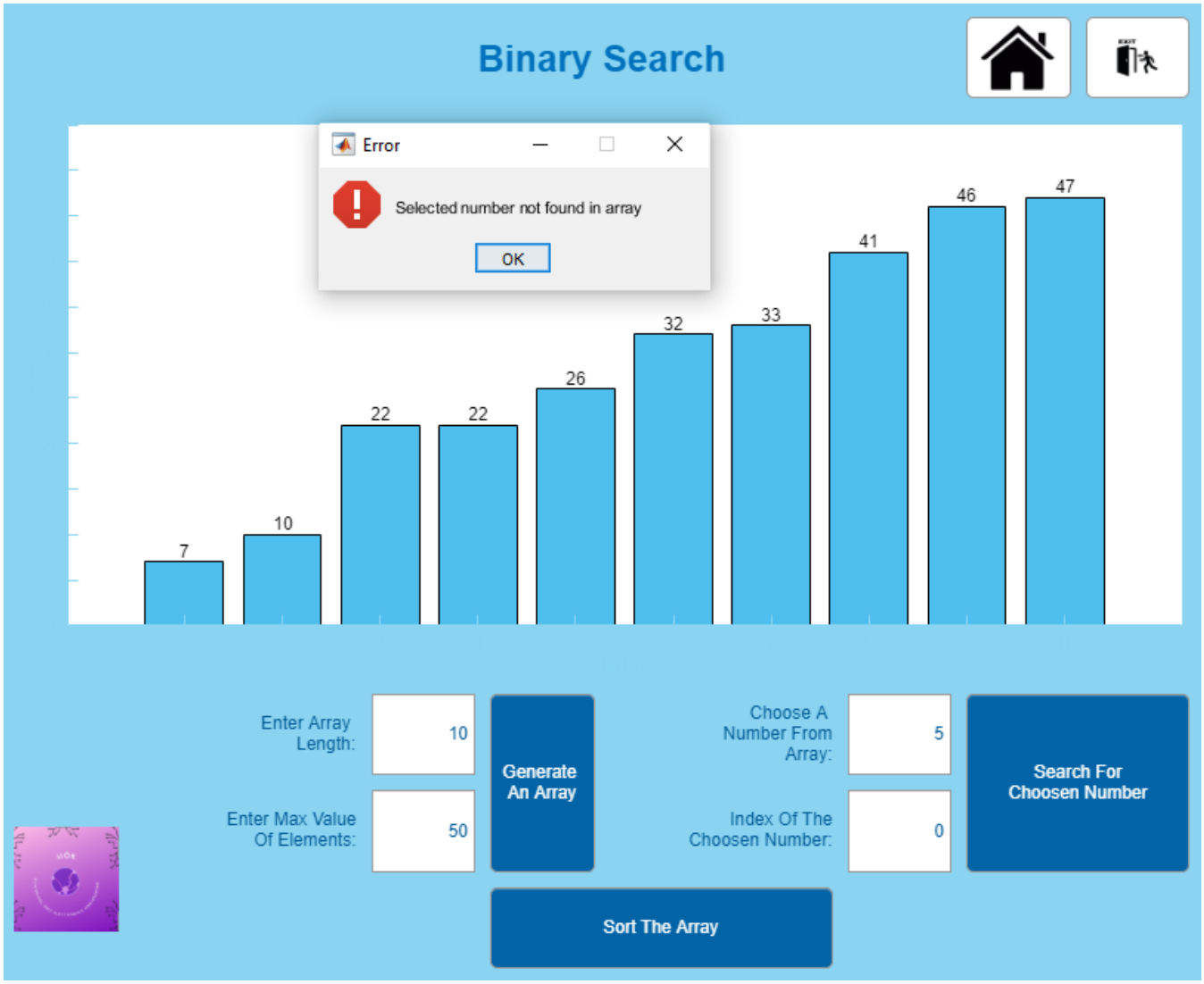
Generate An Array

Choose A Number From Array: 38

Index Of The Choosen Number: 8

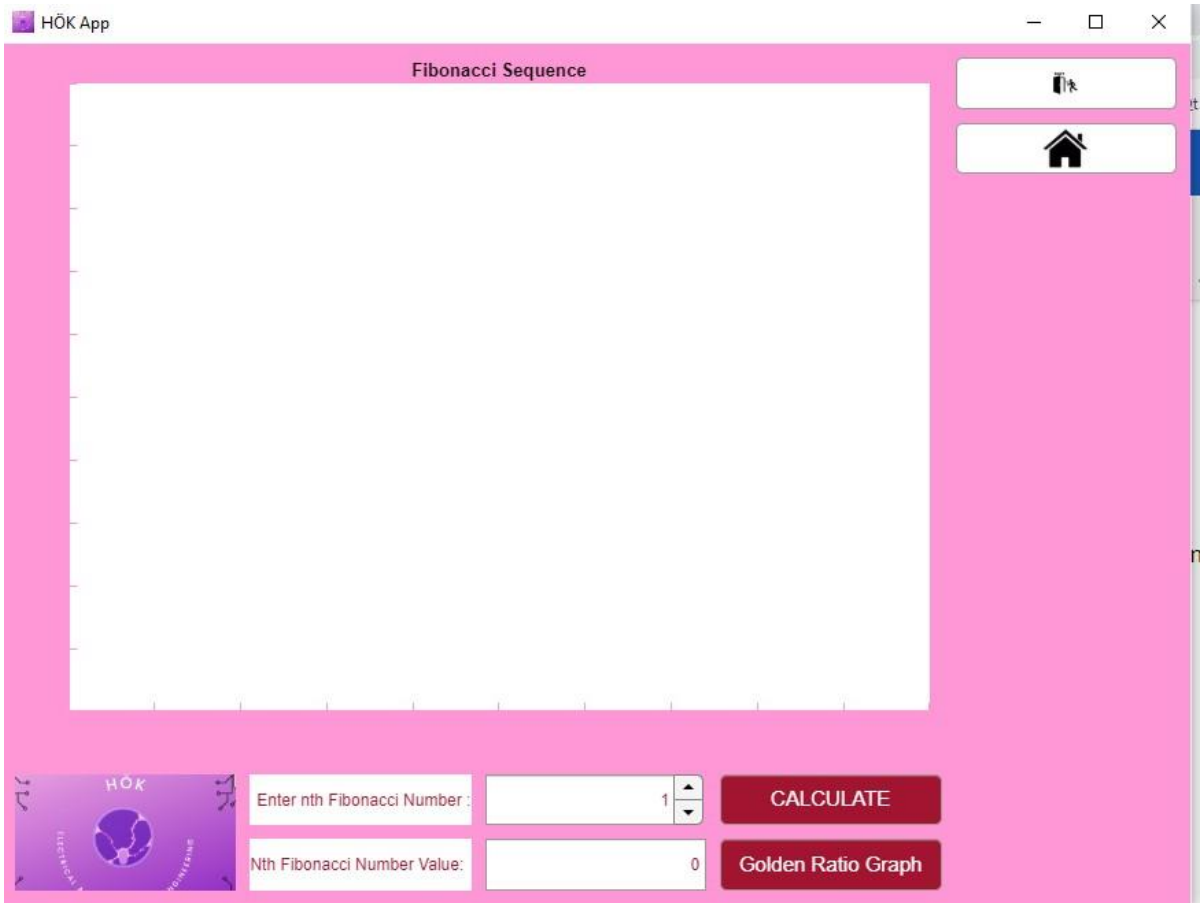
Search For Choosen Number

Sort The Array



Fibonacci Sequence Page:

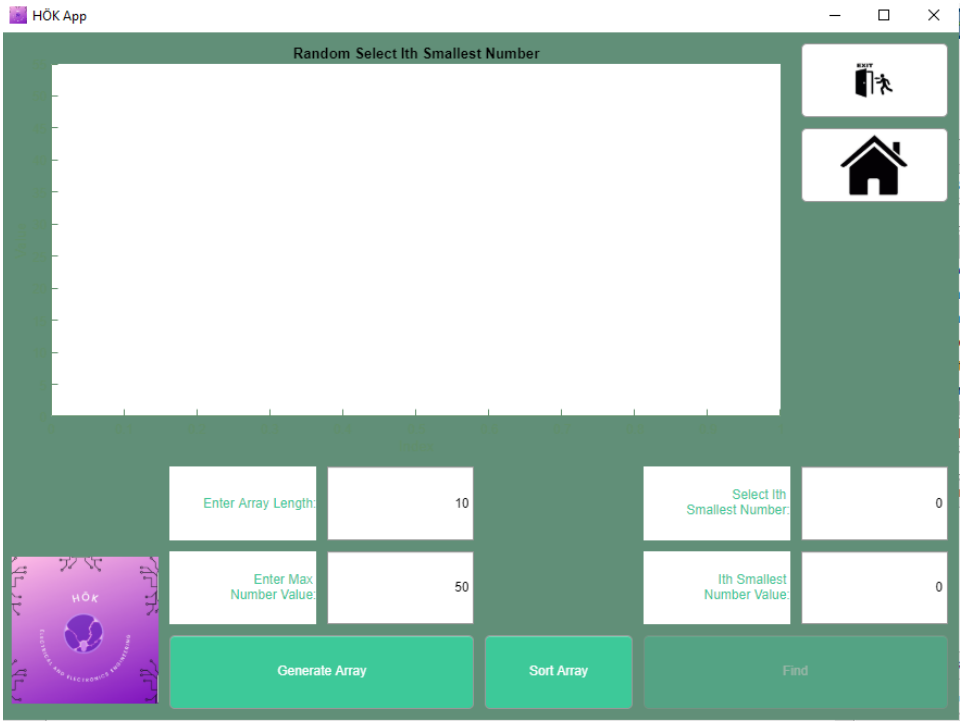
We can access this page with the help of the "fibonacci sequence" button on the login screen.



- **On this page, the value of the nth number can be found in the Fibonacci series, which is a special series. For this, the desired number is written first, and then the value of the desired number is found by pressing the calculate button. In addition, when the "Golden Ratio Graph" button is pressed, the graph of the golden ratio between the numbers in the fibonacci series is displayed.**

Ith Smallest Number Page:

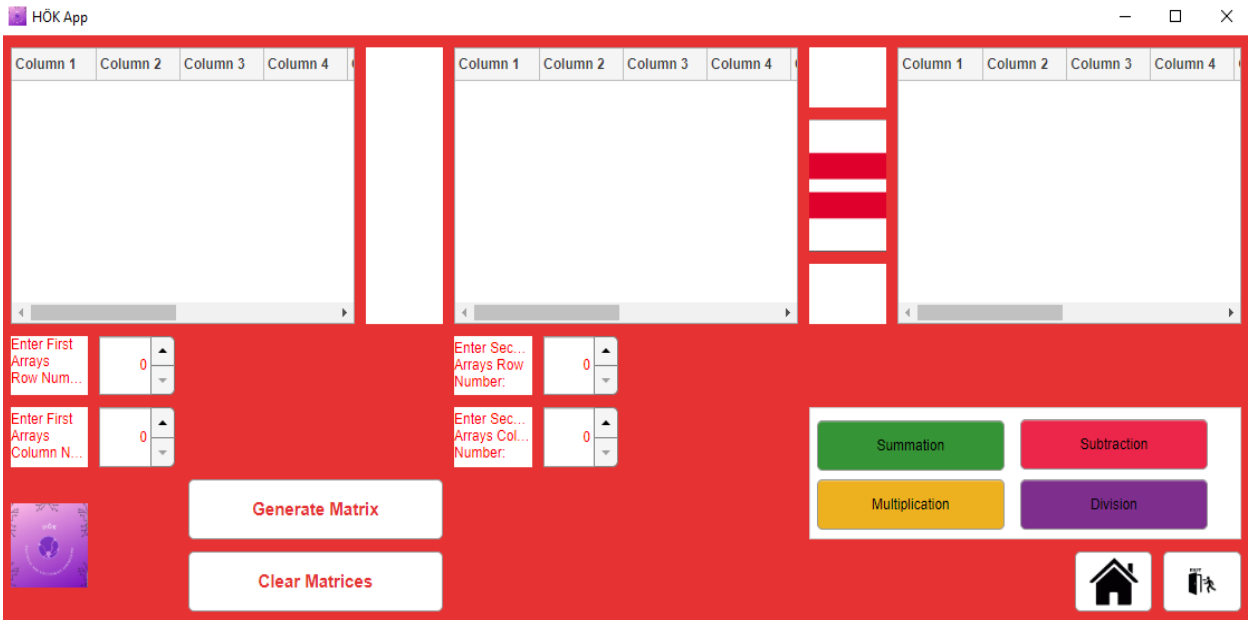
We can access this page with the help of the "find ith smallest number" button on the login screen.



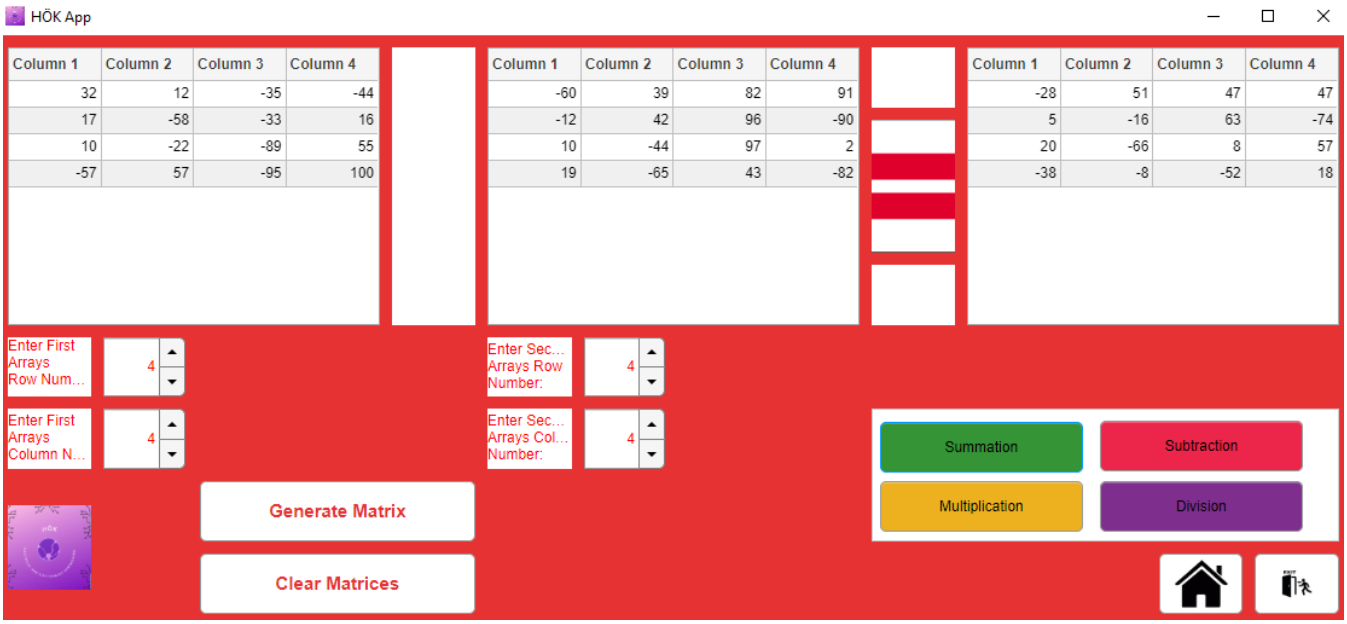
- **In this page , user can find ith smallest number in the array and find its value in the array. For this purpose first user must generate an array and then sort the array. If user will not sort the array , find button will be not enable. After sorting array,user should write the ith number then when the find button is pressed, numbers value will be appear on the line edit. If number is not in the array then error message will appear on the screen. If the user enters a number larger than the size of the array or a number less than zero, the operation will not start and the error message will be displayed.**

Matrix Calculations Page:

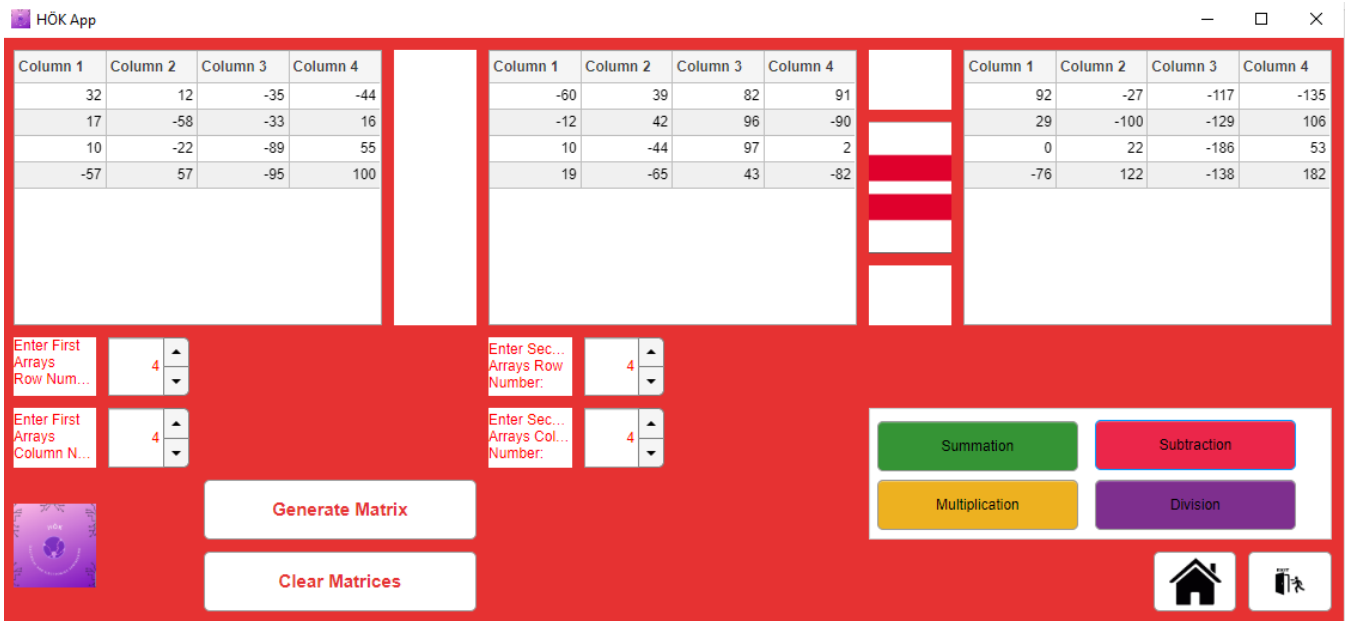
We can access this page with the help of the "matrix calculations" button on the login screen.



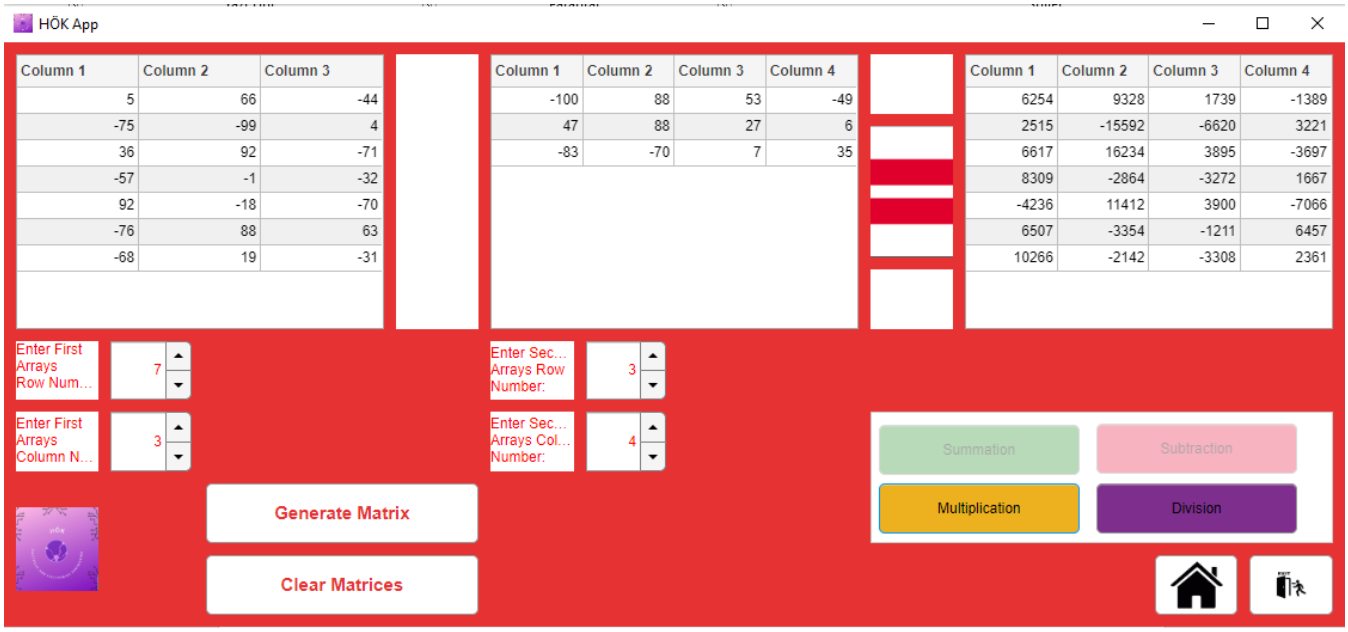
- **In this section, arithmetic operations can be performed for two matrices. First of all, the user must create random matrices with the row and column values user chooses. Then user should press the button of the arithmetic operation user wants to do. If the sizes of the matrices are not suitable for performing arithmetic operations, the buttons will be inactive and operations will not be performed. All matrices can be cleaned with the help of the clean button.**



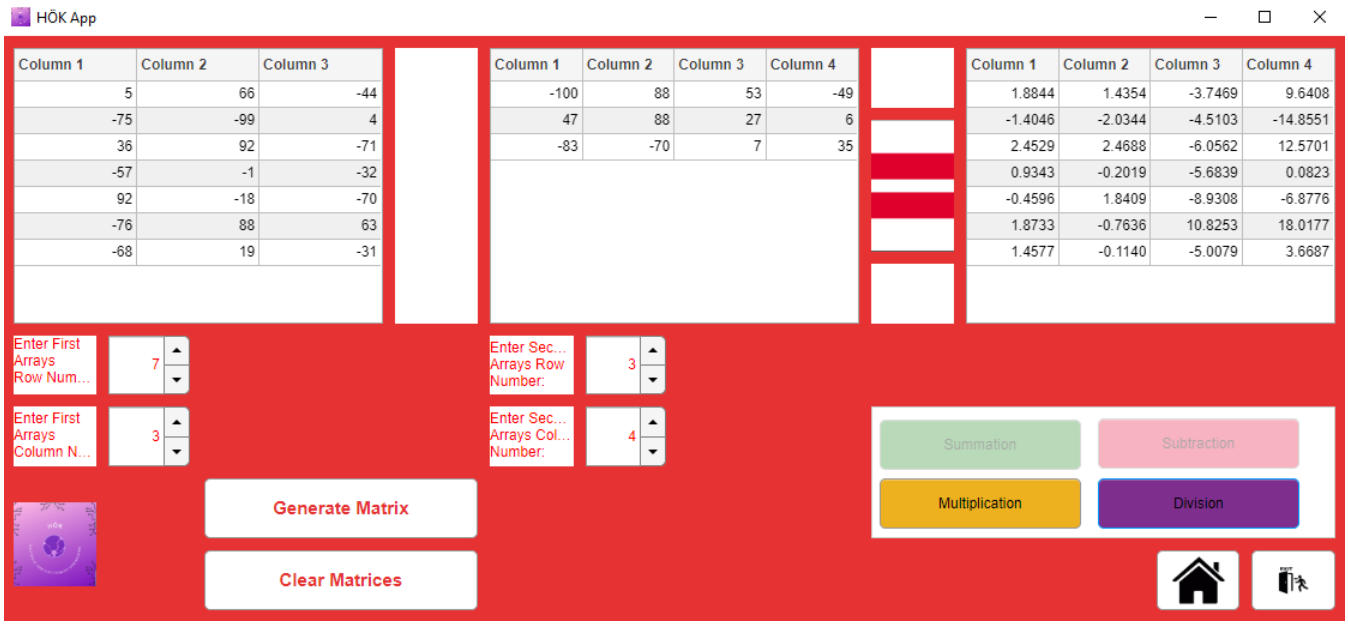
Summation



Subtraction



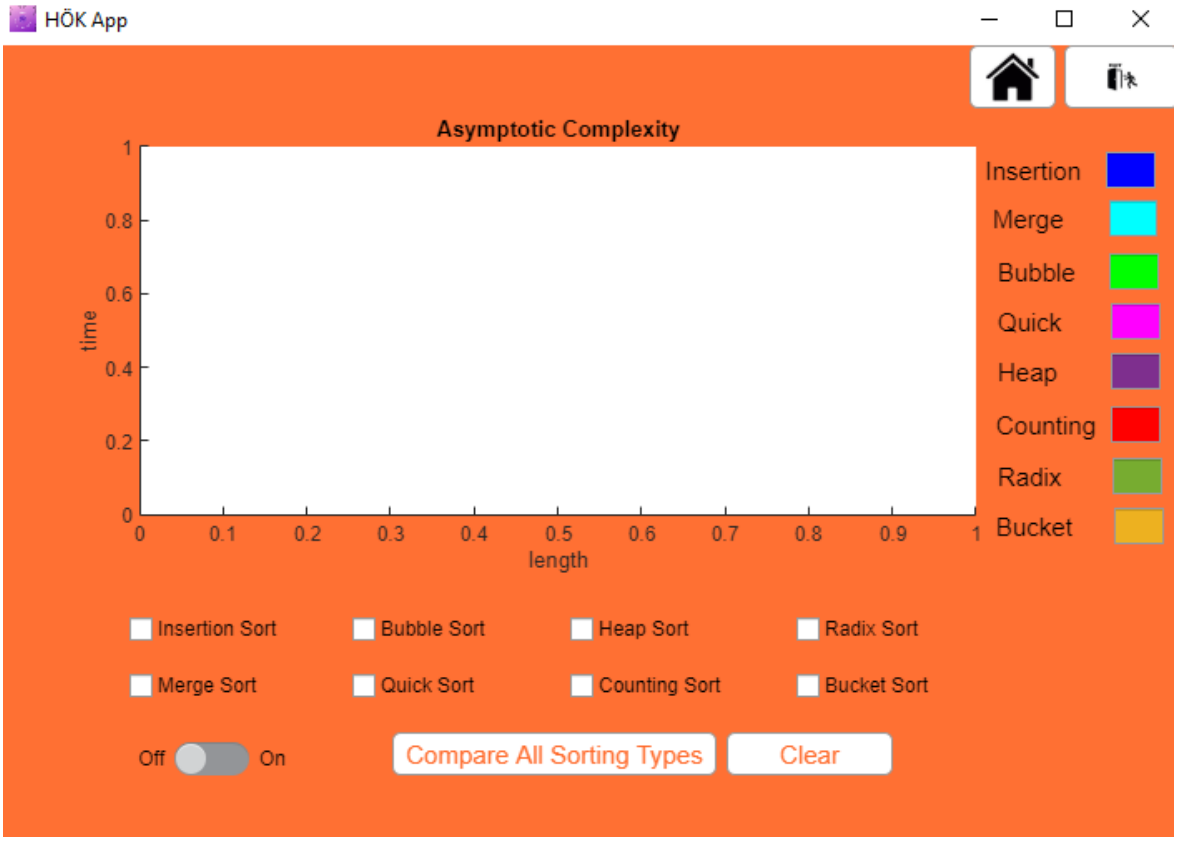
Multiplication



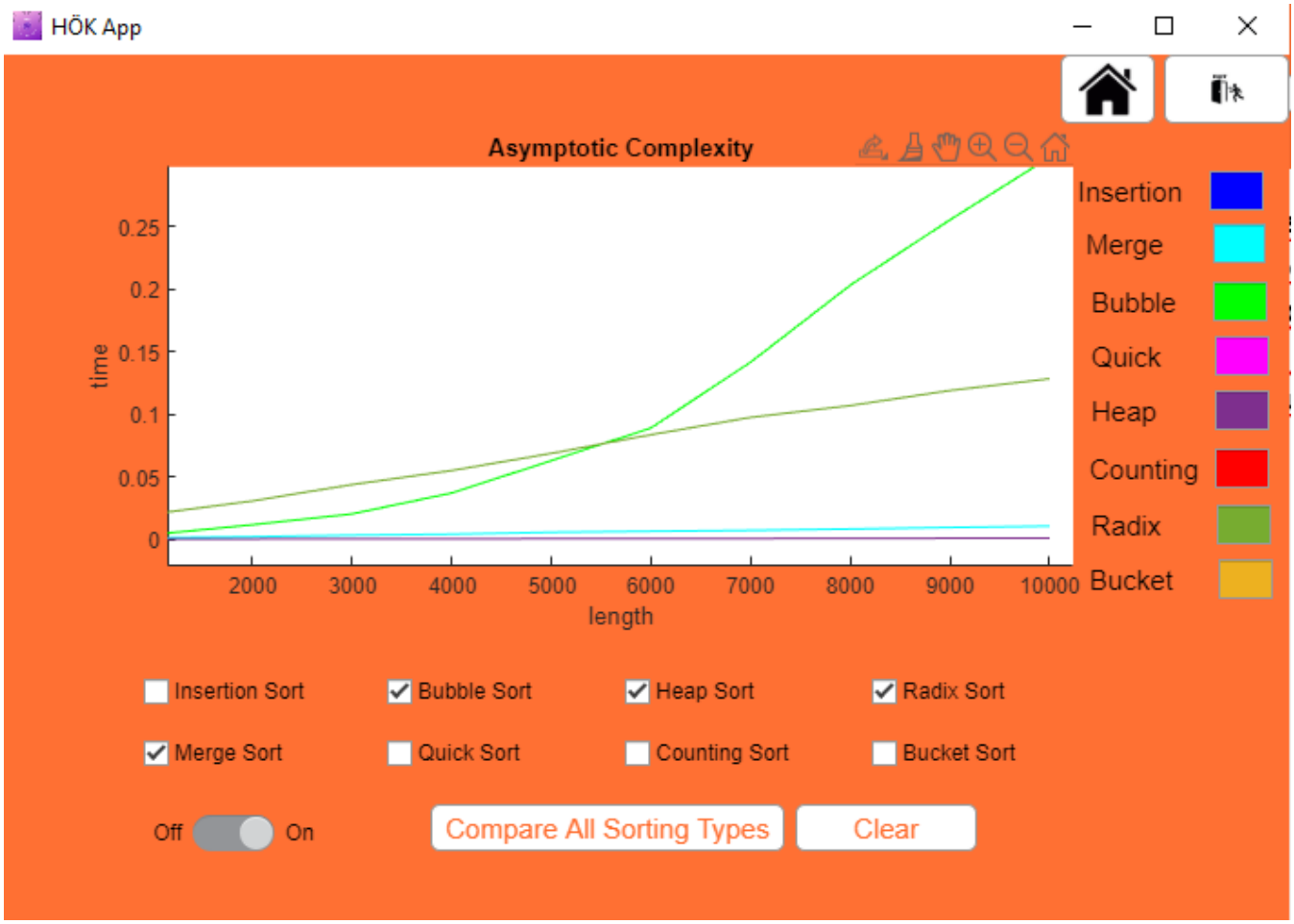
Division

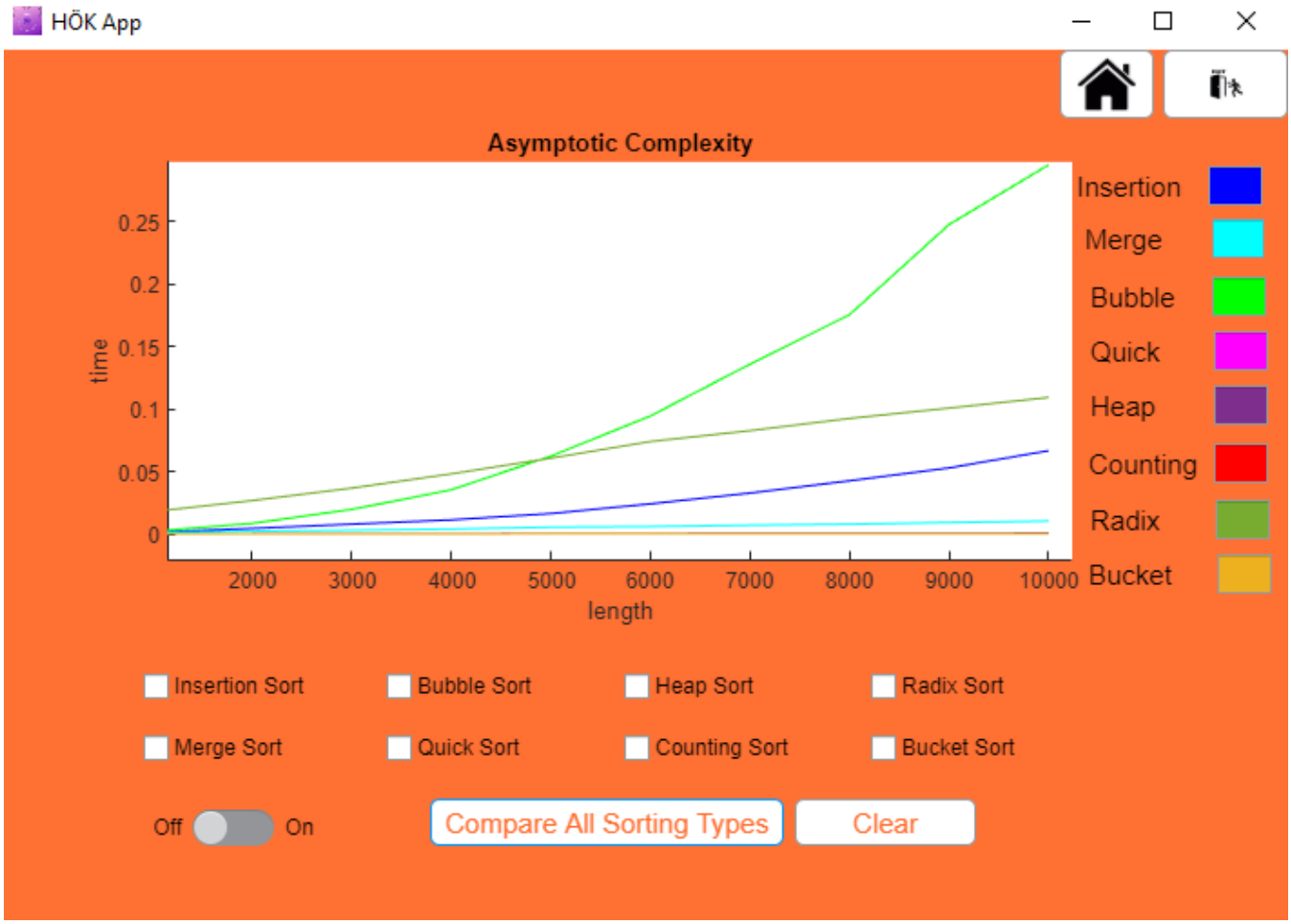
Comparison Page:

We can access this page with the help of the "comparison" button on the login screen.



- **On this page, it is possible to compare how fast the sorting types are sorted with the asymptotic graphs. Which sorting types are to be compared should be marked and then the switch should be set to the "on" position. If all types are wanted to be sorted, comparison can be made by pressing the "Compare All Sorting Types" button. When the "Clear" button is pressed, the graph will be cleared.**


HÖK App
Asymptotic Complexity
time
length
0.25
0.2
0.15
0.1
0.05
0
2000
3000
4000
5000
6000
7000
8000
9000
10000
Insertion
Merge
Bubble
Quick
Heap
Counting
Radix
Bucket
Insertion Sort
Bubble Sort
Heap Sort
Radix Sort
Merge Sort
Quick Sort
Counting Sort
Bucket Sort
Off
On
Compare All Sorting Types
Clear

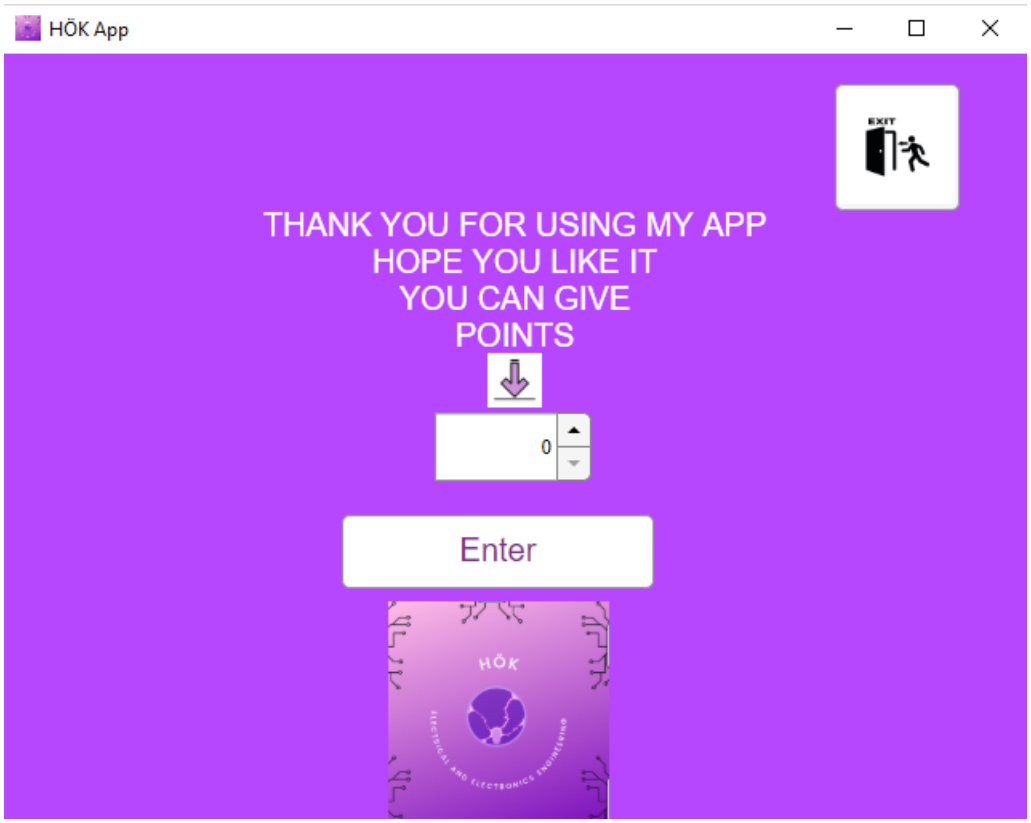


Exit Page:

We can access this page with the help of the exit button which is found on every page.

Exit Button Icon

- **When this page is entered, all other open pages are closed and this page appears. On this page, users can score the application between 0-5. These scores are saved in a file. In order to close the application completely, the application can be closed by pressing the exit button in the upper right corner.**


HÖK App
EXIT
THANK YOU FOR USING MY APP
HOPE YOU LIKE IT
YOU CAN GIVE
POINTS
0
Enter
HÖK