



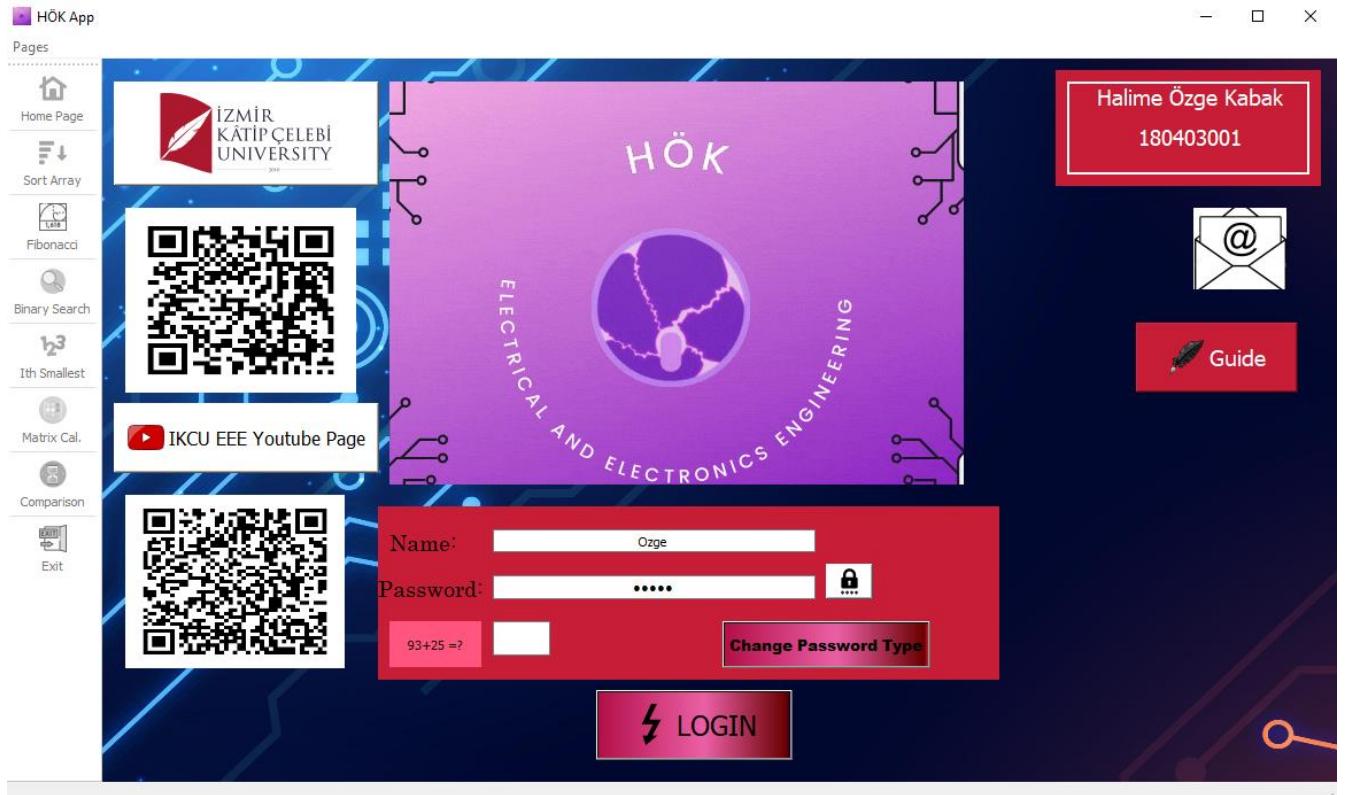
İZMİR
KÂTİP ÇELEBİ
ÜNİVERSİTESİ

2010

EEE321
INTRODUCTION TO ALGORITHMS
PYTHON PyQt5 PROJECT REPORT

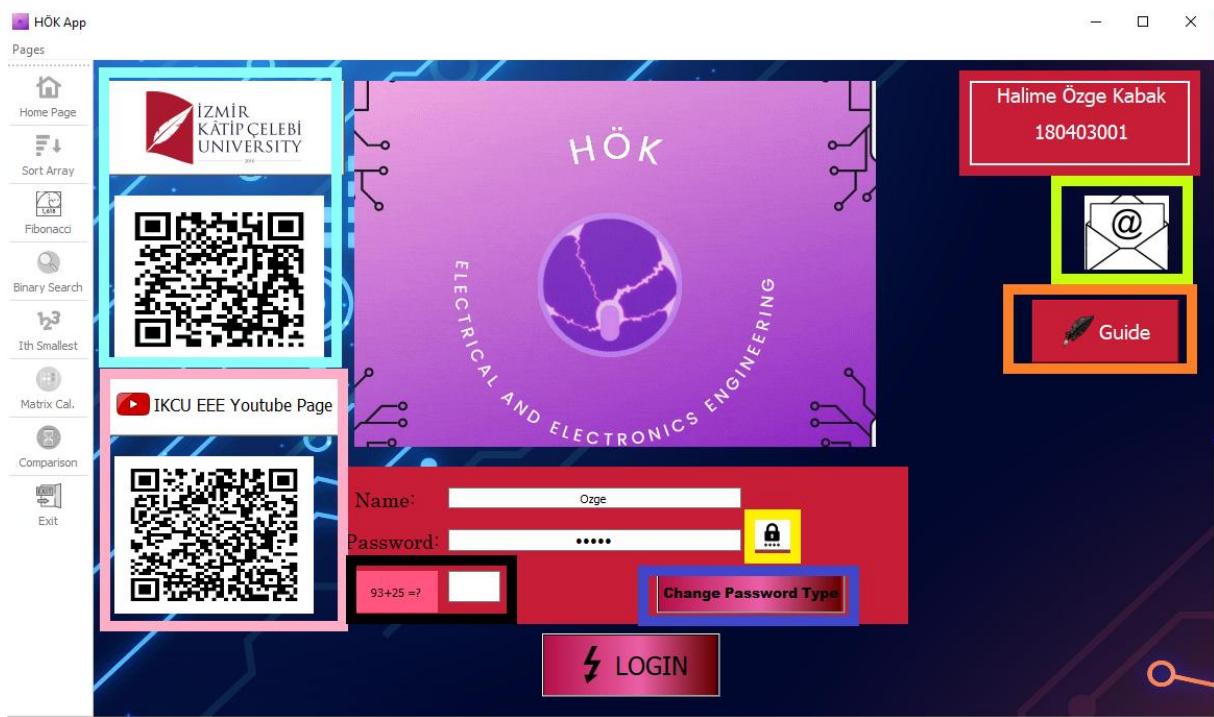
HALİME ÖZGE KABAĞ 180403001

LOGIN PAGE:



- ❖ This page is the home page of the application. Unless the correct password is entered on this page and the result of the summation is correct, other pages will not be entered.
- ❖ It will be possible to access the pages with the name written through this toolbar, but the toolbar will remain inactive unless the login is provided. If the login is provided, the toolbar will be active. When returning to the login page from other pages, the toolbar will be inactive again.





- ❖ When the button in the blue rectangle is pressed on this page, it directly redirects to the school's web page. Also, when the QR code below is read, it is directed to the school's web address too. When the button in the area shown with the pink rectangle is pressed, it directly redirects to the youtube page of the electrical and electronic engineering department of the school. When the QR code is read, it is directed directly to the youtube page. With the help of the button in the green rectangle, e-mails can be sent directly to my e-mail account. With the help of the button in the orange area, a guide describing how to use the application is opened. The type of password to be entered can be changed with the help of the button in the blue area. With the help of the button in the yellow area, the password can be made visible. In the black area, the changing addition arithmetic operation is asked for each entry, and if this operation is not correct, the entry cannot be provided.

A close-up view of the password entry field. The password "12345" is displayed in the text input field. To the right of the input field is a lock icon with three dots, indicating that the password is currently hidden. Below the input field is a "Change Password Type" button.

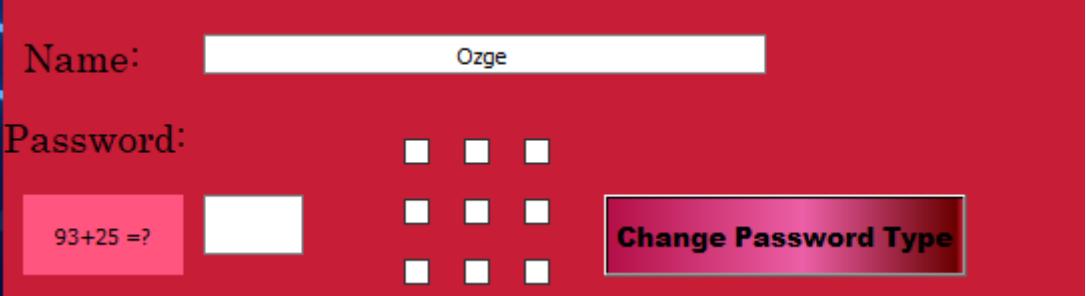
Password can be visible.

Name: Ozge

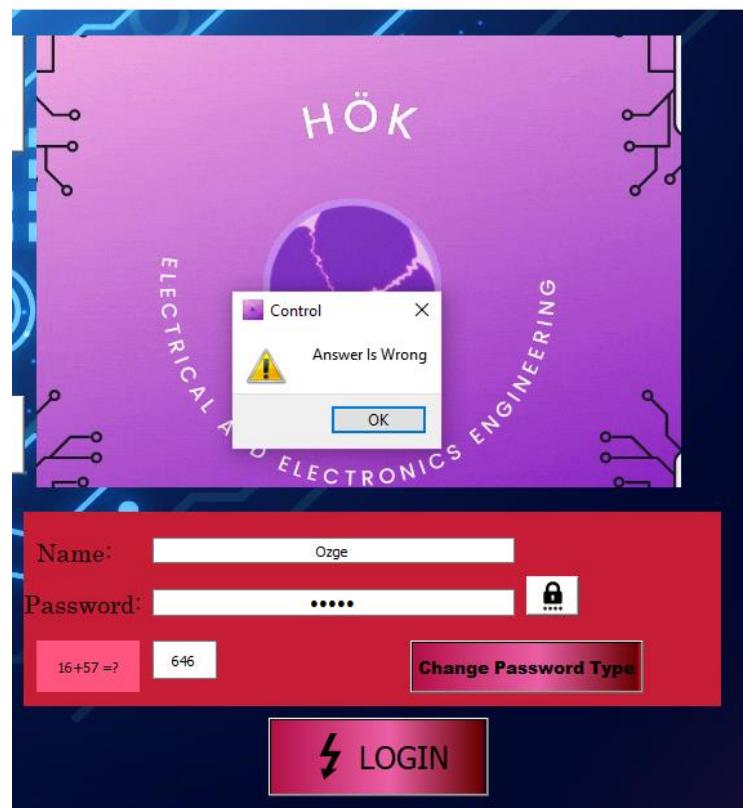
Password:

93+25 =?

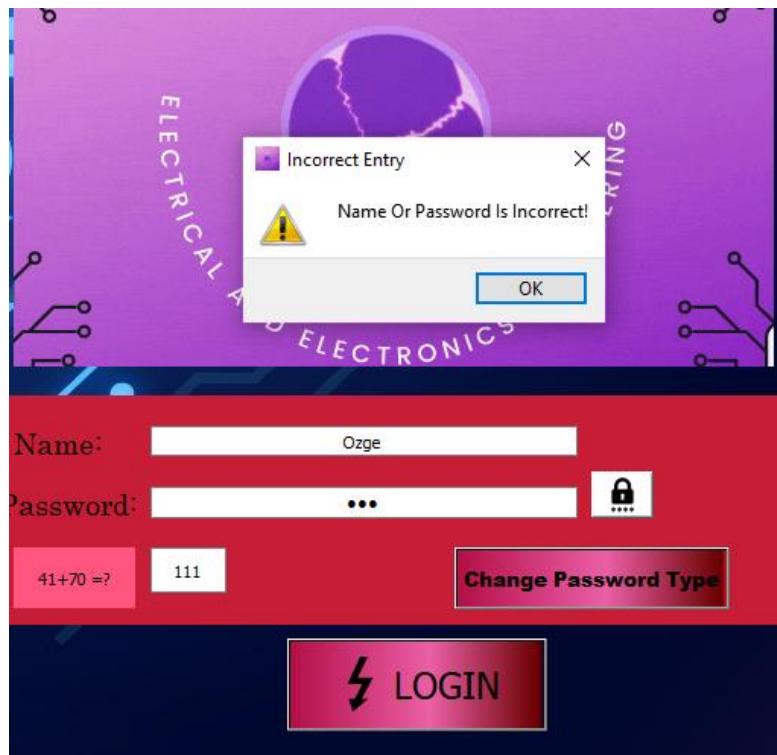
Change Password Type



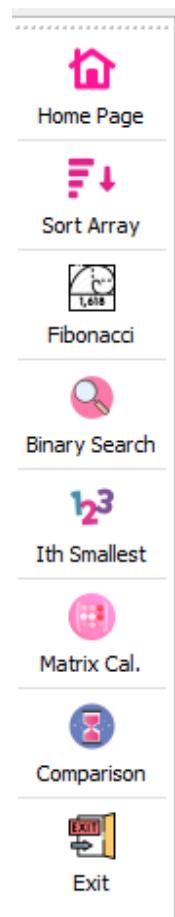
Password can be change and it can be a pattern password instead of number password. For the correct answer correct checkboxes should be marked.



Even if the password and username are correct, if the arithmetic operation is not correct, the user receives a warning and the login operation is not successful.

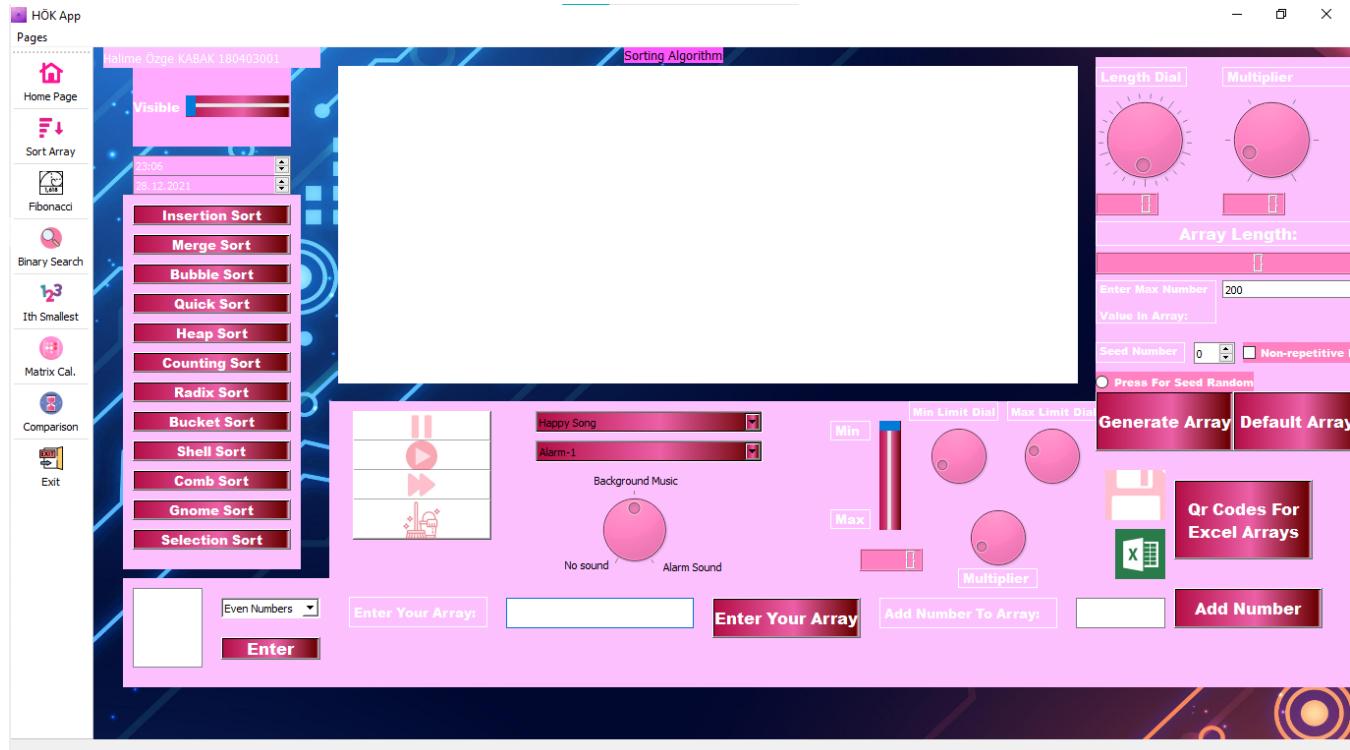


Even if the arithmetic operation is correct, if the password or user name is entered incorrectly, the user will still receive an error message and the login will not occur.

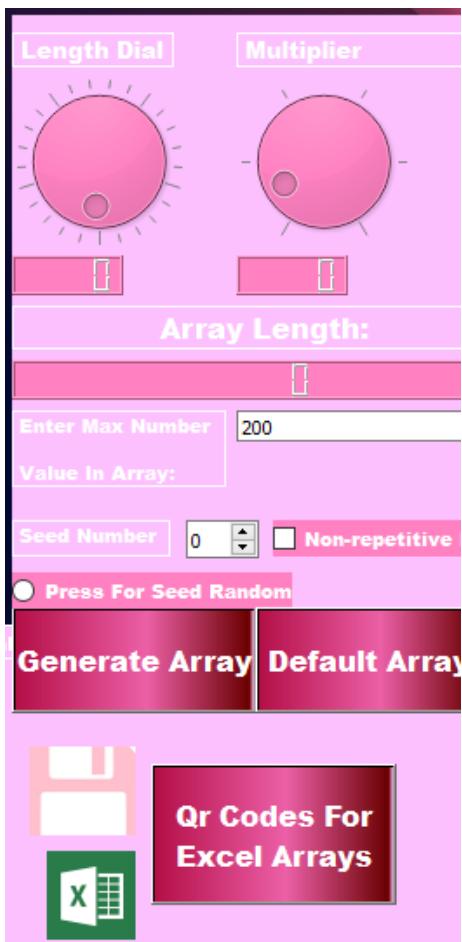


- The Home Page can be accessed by clicking here.
- The Sort Array Page can be accessed by clicking here.
- The Fibonacci Page can be accessed by clicking here.
- The Binary Search Page can be accessed by clicking here.
- The Ith Smallest Page can be accessed by clicking here.
- The Matrix Calculations Page can be accessed by clicking here.
- The Comparison Page can be accessed by clicking here.
- The Exit Page can be accessed by clicking here.

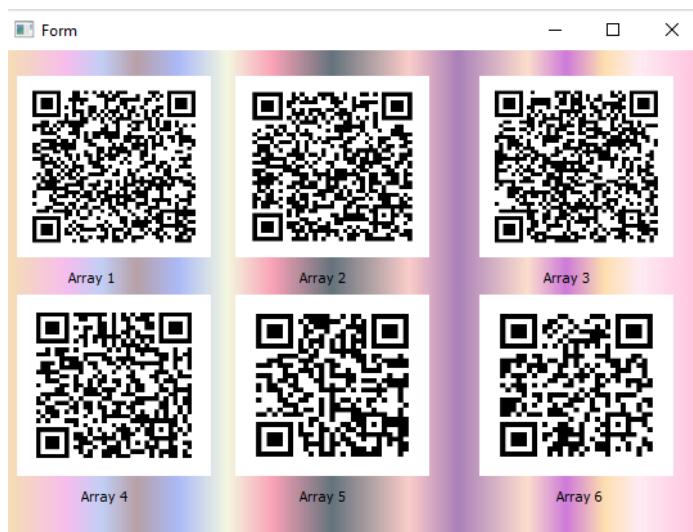
SORTING PAGE:



- ❖ On this page, arrays can be created in various different ways and these arrays can be sorted with the desired algorithm type.
- ❖ In this section, arrays can be created in 4 different ways. First, the size of the array can be adjusted using the length and multiplier dials. The length of the array will be equal to the product of length and multiplier. Then, the maximum number value that can be found in the array can be determined. Then the user can create an array by pressing the "Generate Array" button. If the user does not want repeating numbers in the array. Can tick the "Non-Repeating Numbers" checkbox. When user press the "Default Array" button, random array will appear with random size and max value. When the seed number radio button is clicked, seed array will

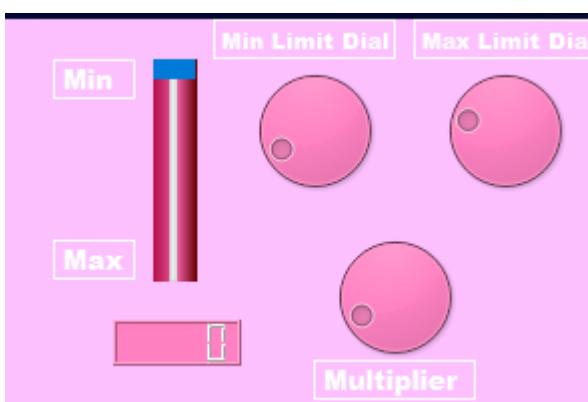


be appear according to its seed number value. Another way to create an array is to get an array from excel. For this, the excel file is selected by pressing the button with the Excel icon. Then the array is created. Before the user inserts the arrays previously created by me, the numbers in the array can be displayed by scanning the QR Code created for each array on the page opened by clicking the "QR Codes For Excel Arrays" button. In addition, with the help of the other button above the excel array button, it allows the array in the application to be saved as a CSV file.



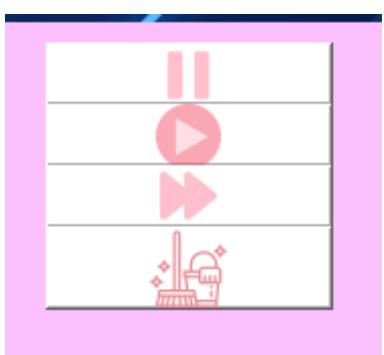


- ❖ In this section, there is the fifth method to create an array. Here, the user can write the numbers they want by putting commas between them. Then, you can create an array by pressing the enter button, or a number can be added to a previously created array from the "add number" section.



❖ With this part, 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 dials next to it. With these dials, minimum and maximum limits can be determined and these values can be increased by using the multiplier dial. Multiplier dial multiplies the values of other dials and this determines the minimum and maximum limits of the slider. In the lcd screen at the bottom, we can see the value of the current speed of the slider.



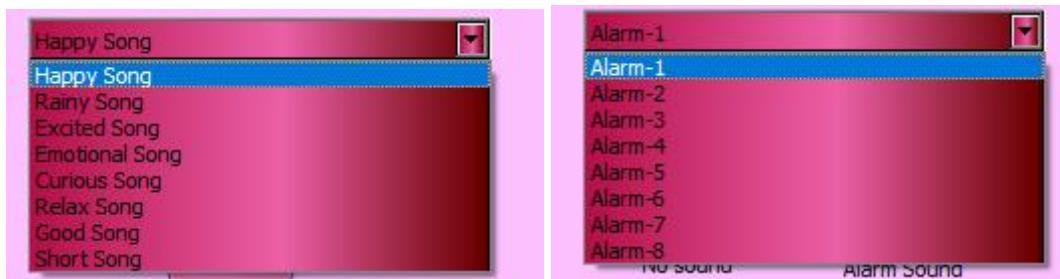
- ❖ With the help of this button group, operations such as stopping and skipping directly can be performed during the sorting process.

The first button is the pause button, thanks to this button, the sorting process can be paused. With the button under it, the stopped operation can be started again. With the help of the 3rd button, the sorting process is bypassed and the sorted array is displayed directly. The 4th button is the clean button and allows the graphic to be cleaned.

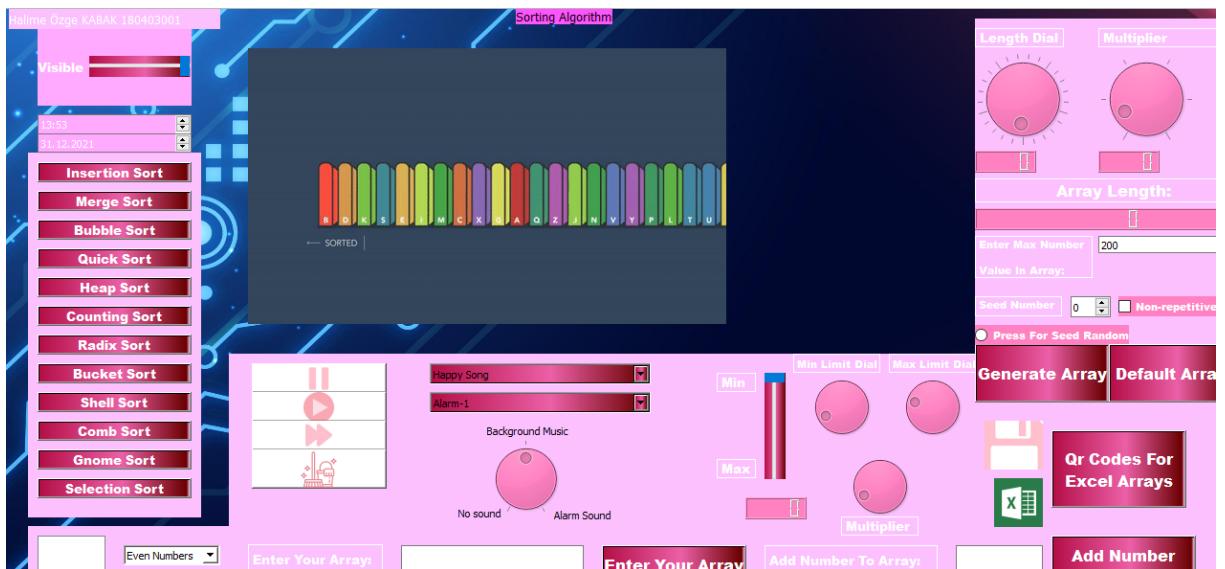


❖ In this section, the sound selection during sorting can be made with the help of the dial. If the user selects the "No Sound" option, there will be no sound effects during the sorting. If the user selects the "Background Music" option, the music selected by the user will be

played in the background during the sorting process. The user has 8 song options, whichever user chooses will play in the background. If the user selects the "Alarm Sound" option, one of the alarms selected by the user will sound after the sorting process is completed. The user has 8 alarm sound options.



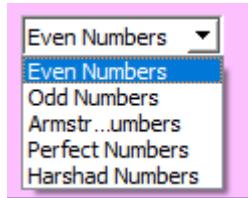
❖ With the help of the switch in this section, the graphic can be made invisible and restored to its original state. The section below contains the current time and date information. In this way, the user will be able to receive information about the time and date while using the application. Sorting can be done with the buttons below. There are 12 sorting types here.



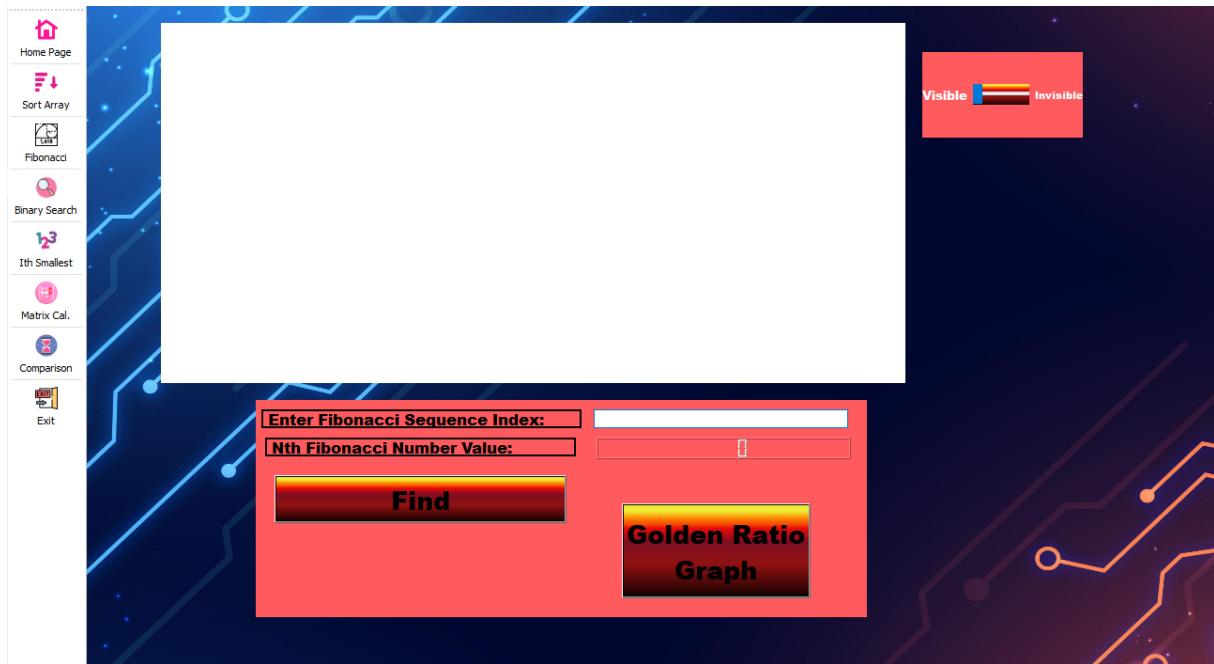
❖ In this section, the numbers to be searched specifically can be found among the numbers in the array. The number types that can be searched are odd numbers, even numbers, perfect numbers, harshad numbers, armstrong numbers.

Even Numbers ▼

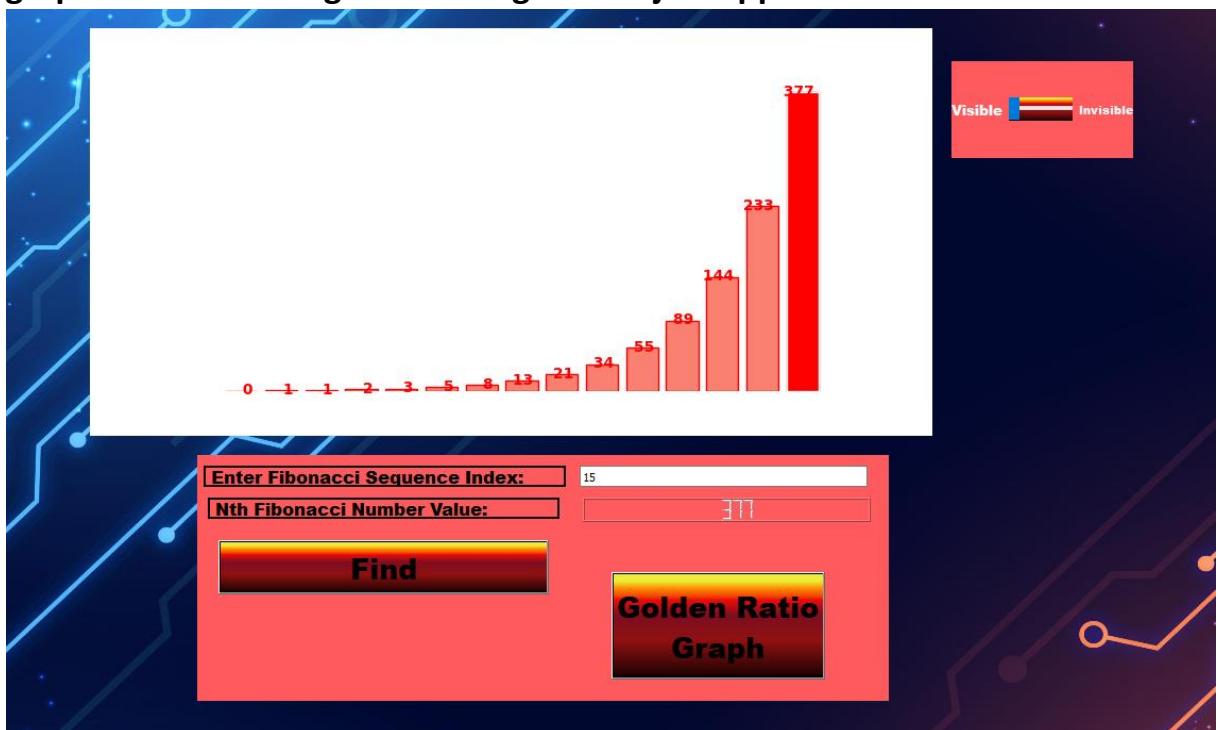
Enter

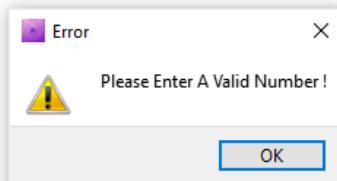
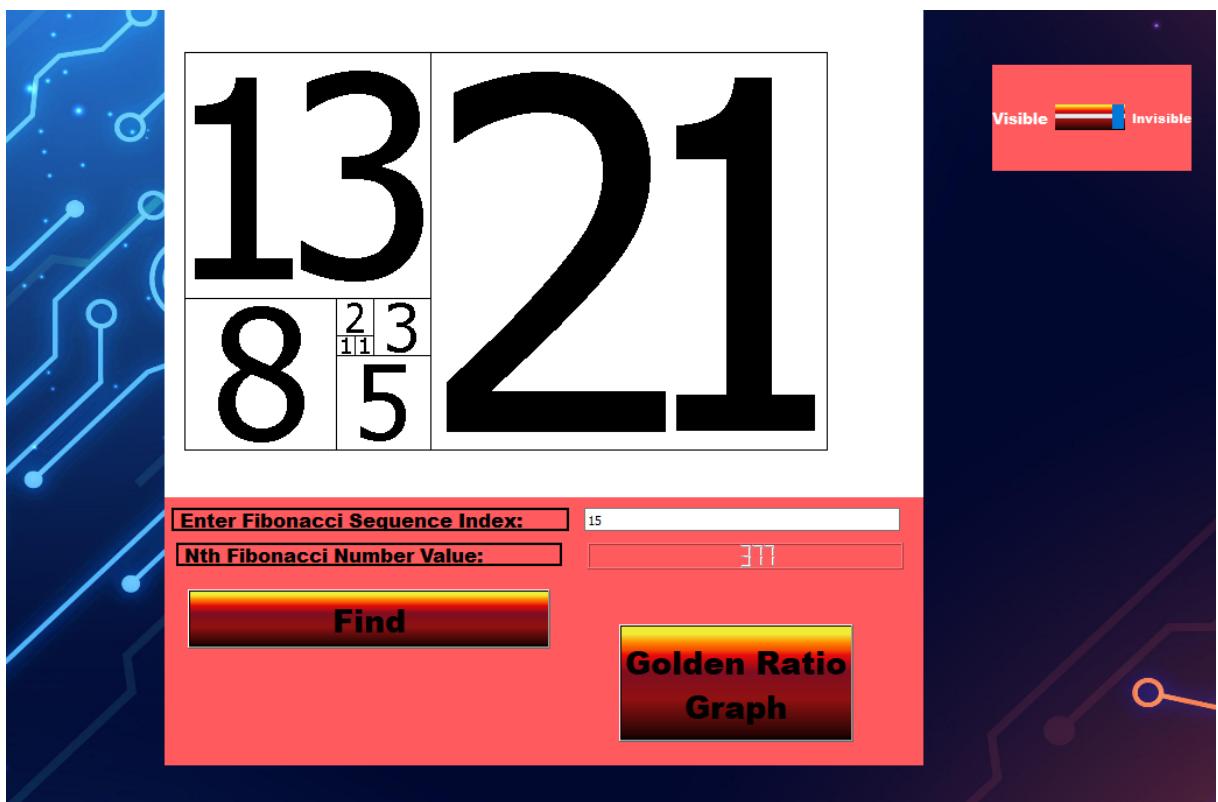


FIBONACCI PAGE:



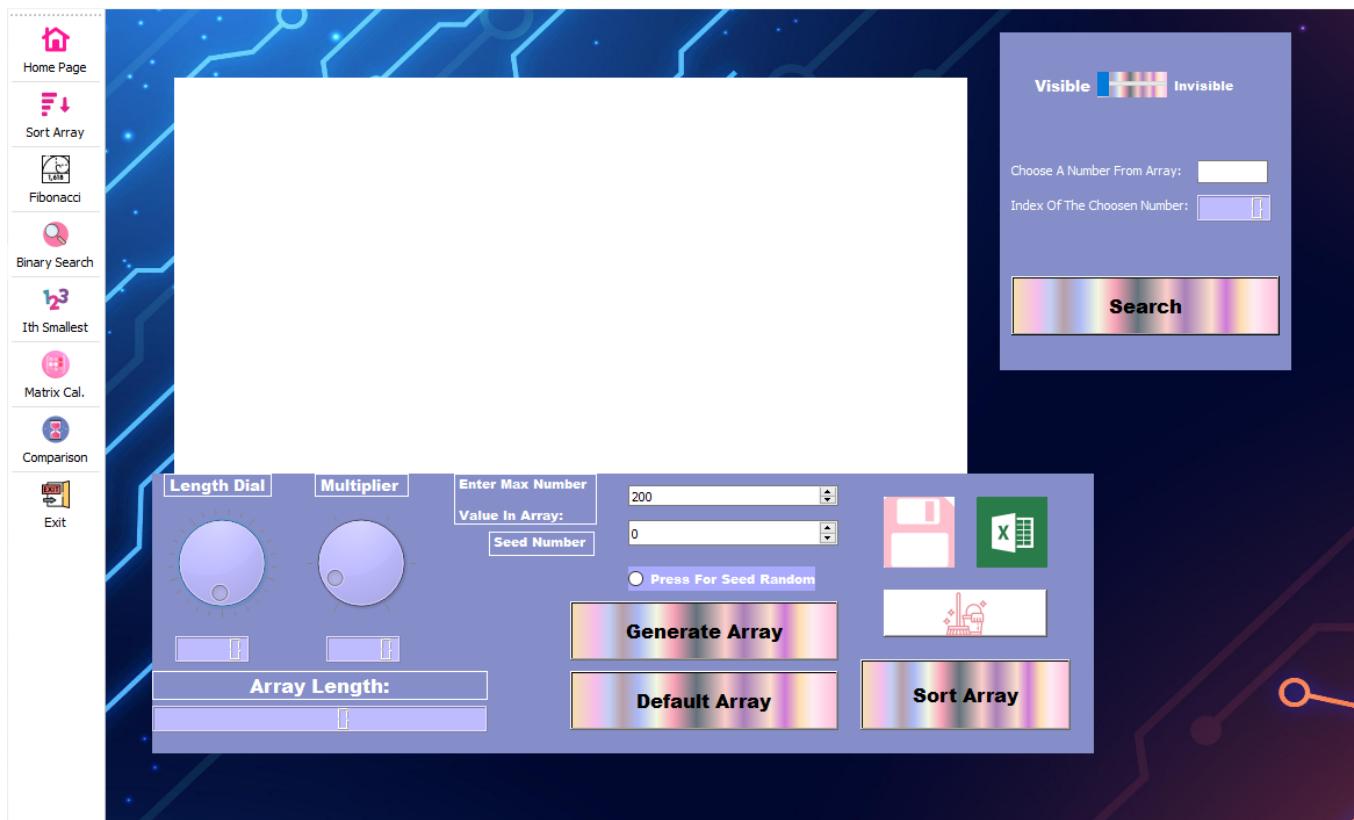
- ❖ On this page, the value of the nth number can be found in the Fibonacci series, which is a special series. For this, the desired number is written first, and then the value of the desired number is found by pressing the calculate button. In addition, when the "Golden Ratio Graph" button is pressed, the graph of the golden ratio between the numbers in the fibonacci series is displayed. When the graphic is set to invisible, the graphic closes and a gif describing the subject appears instead.



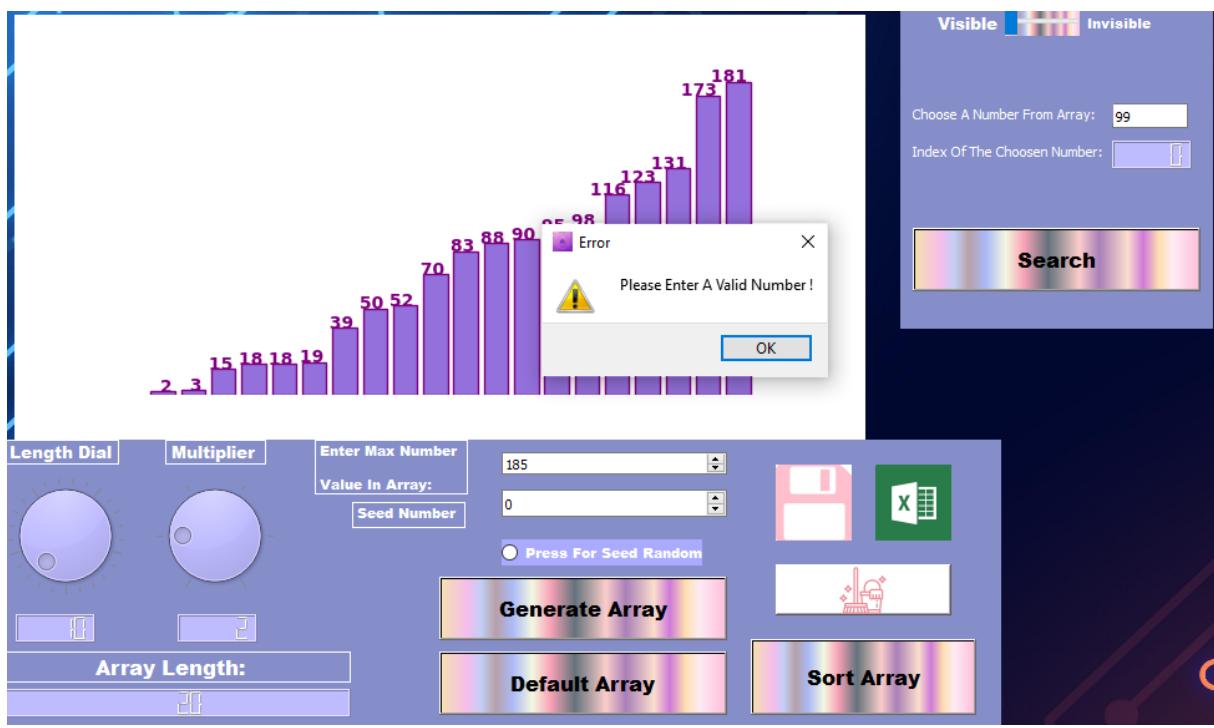


If the user selects a number less than zero, an error message will appear on the screen.

BINARY SEARCH PAGE:

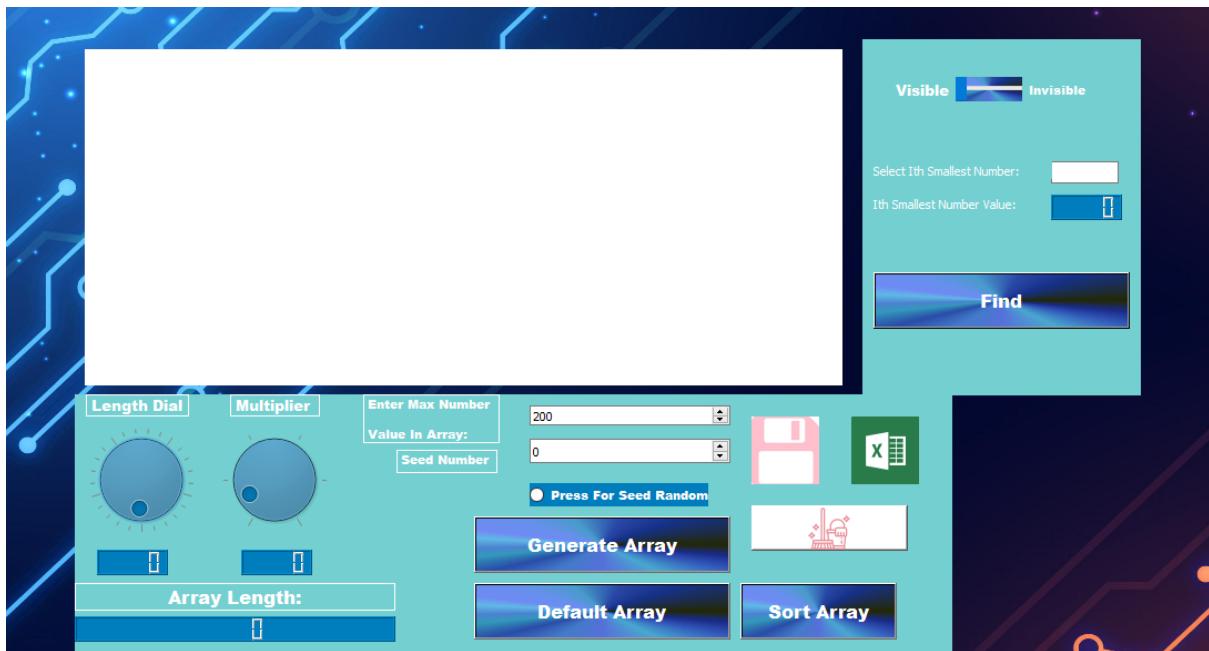


- ❖ In this page , user can search a number in the array and find its index in the array. For this purpose first user should obtain an array fort his purpose user has three options.First one is generating own array and second is using a default array or third way using a seed array.For generating array, user should select size of array and maximum number in the array then press the “Generate Array” button.Length dial and multiplier dials values product is equal to the array length and max number value is equal to spinner value which is selected by user. When user press the “Default Array” button, random array will appear with random size and max value.When the seed number radio button is clicked, seed array will be appear according to its seed number value.Then user should 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. When the graphic is set to invisible, the graphic closes and a gif describing the subject appears instead.

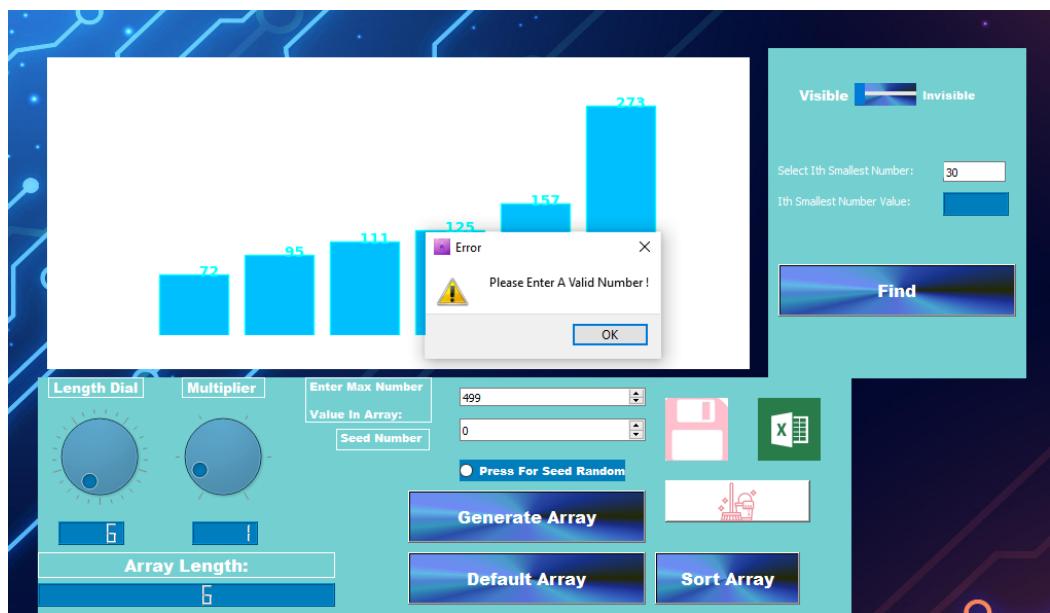




ITH SMALLEST NUMBER PAGE:



- ❖ In this page , user can find ith smallest number in the array and find its value in the array. For this purpose first user should obtain an array for this purpose user has three options.First one is generating own array and second is using a default array or third way using a seed array.For generating array, user should select size of array and maximum number in the array then press the “Generate Array” button.Length dial and multiplier dials values product is equal to the array length and max number value is equal to spinner value which is selected by user. When user press the “Default Array” button, random array will appear with random size and max value.When the seed number radio button is clicked, seed array will be appear according to its seed number value.Then user should sort the array. If user will not sort the array , searching button will be not enable. After sorting array,user should write the ith smallest number index then when the find button is pressed, ith smallest number value will be appear on the line edit. If ith index is not valid then error message will appear on the screen. When the graphic is set to invisible, the graphic closes and a gif describing the subject appears instead.



MATRIX OPERATIONS PAGE:

- ❖ When the page is first opened, the matrix tables are invisible and instead there is a gif that gives information about the subject. When the switch is made visible, the gif will disappear and matrix tables will appear instead. 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.

The screenshot shows a matrix calculator interface. At the top, there are three 2x2 matrices:

- Matrix 1: Row 1 [1, 2], Row 2 [1, 70; 2, 5]. Value 88 is highlighted in the cell at [1, 2].
- Matrix 2: Row 1 [1, 2], Row 2 [1, 99; 2, 30]. Value 68 is highlighted in the cell at [1, 2].
- Matrix 3: Row 1 [1, 2], Row 2 [1, 9570; 2, 645]. Value 12240 is highlighted in the cell at [1, 2].

Below the matrices is a control panel with the following settings and buttons:

- Row Of First Array: 2, Column Of First Array: 2
- Row Of Second Array: 2, Column Of Second Array: 2
- Generate Matrix, Clear buttons
- Summation, Subtraction, Multiplication buttons (Multiplication is active)
- Visible (blue bar), Invisible (green bar) switch

Multiplication

The screenshot shows a matrix calculator interface. At the top, there are three 3x3 matrices:

- Matrix 1: Row 1 [1, 2, 3], Row 2 [1, 23, 23], Row 3 [1, 17, 53]. Value 85 is highlighted in the cell at [1, 3].
- Matrix 2: Row 1 [1, 2, 3], Row 2 [1, 21, 21], Row 3 [1, 19, 17]. Value 72 is highlighted in the cell at [1, 3].
- Matrix 3: Row 1 [1, 2, 3], Row 2 [1, 44, 44], Row 3 [1, 36, 70]. Value 157 is highlighted in the cell at [1, 3].

Below the matrices is a control panel with the following settings and buttons:

- Row Of First Array: 3, Column Of First Array: 3
- Row Of Second Array: 3, Column Of Second Array: 3
- Generate Matrix, Clear buttons
- Summation, Subtraction, Multiplication buttons (Summation is active)
- Visible (blue bar), Invisible (green bar) switch

Summation

1	2	3	4
1 14	74	45	42
2 46	50	9	18
3 57	85	57	23
4 48	39	39	94

1	2	3	4
1 99	96	8	2
2 44	17	13	28
3 40	66	53	34
4 74	58	98	53

1	2	3	4
1 -85	-22	37	40
2 2	33	-4	-10
3 17	19	4	-11
4 -26	-19	-59	41

Row Of First Array: 4 Column Of First Array: 4
 Row Of Second Array: 4 Column Of Second Array: 4

Generate Matrix **Clear** **Summation** **Subtraction** **Multiplication**

Visible Invisible

Subtraction

1	2	3	4
1 72	53	61	76
2 42	86	79	73

1	2	3	4	5	6	7
1 16	13	80	23	92	3	30
2 30	79	61	61	6	87	55
3 76	85	13	17	32	80	57

1	2	3	4
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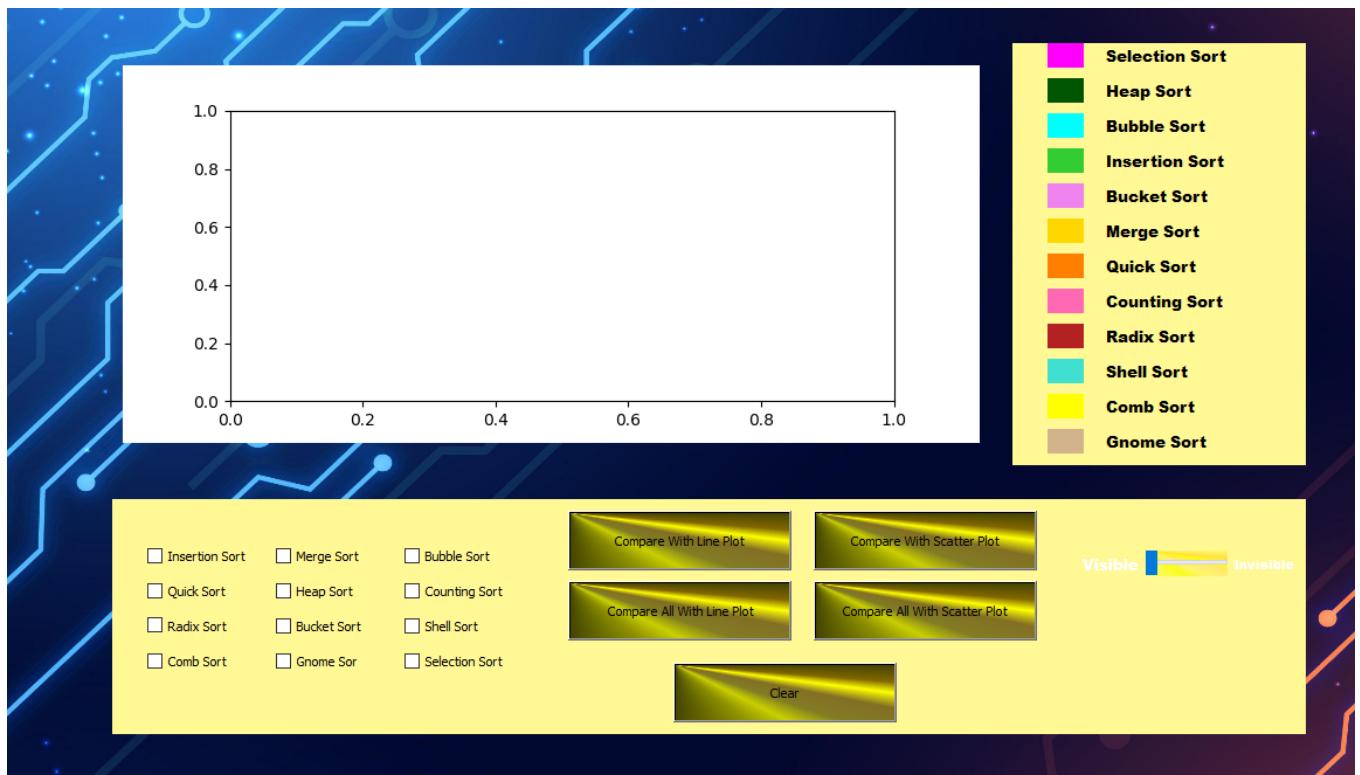
Row Of First Array: 2 Column Of First Array: 4
 Row Of Second Array: 3 Column Of Second Array: 7

Generate Matrix **Clear** **Summation** **Subtraction** **Multiplication**

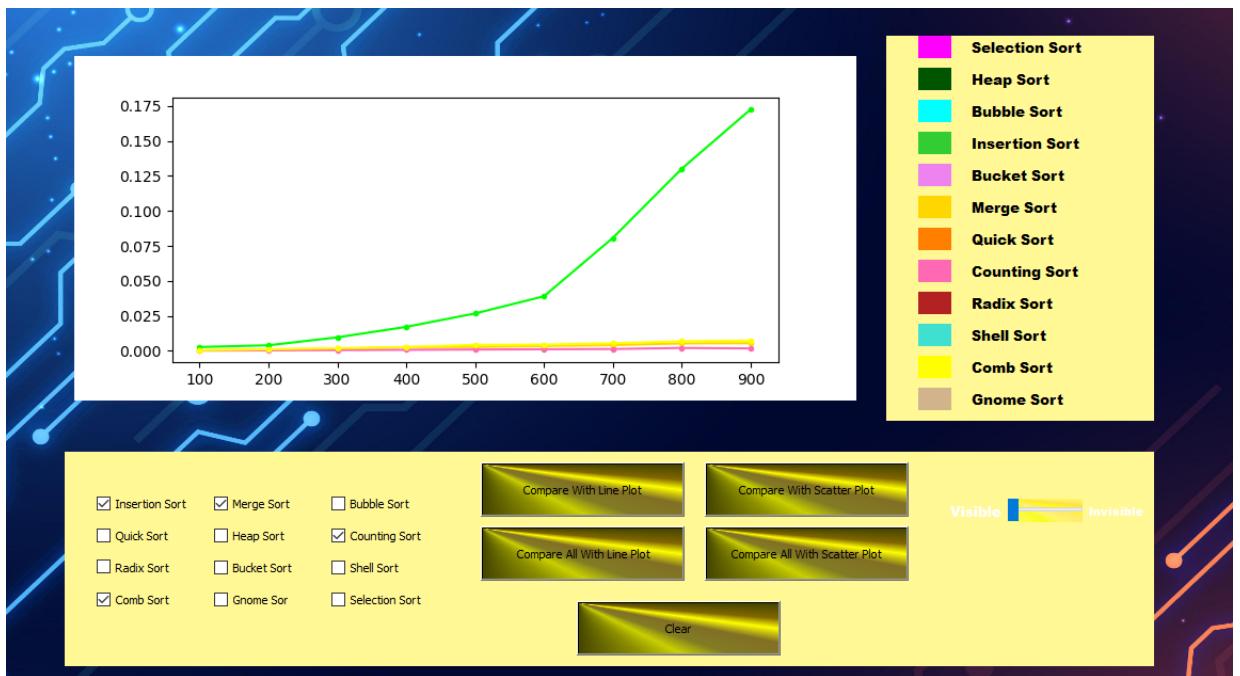
Visible Invisible

Buttons Are Disabled

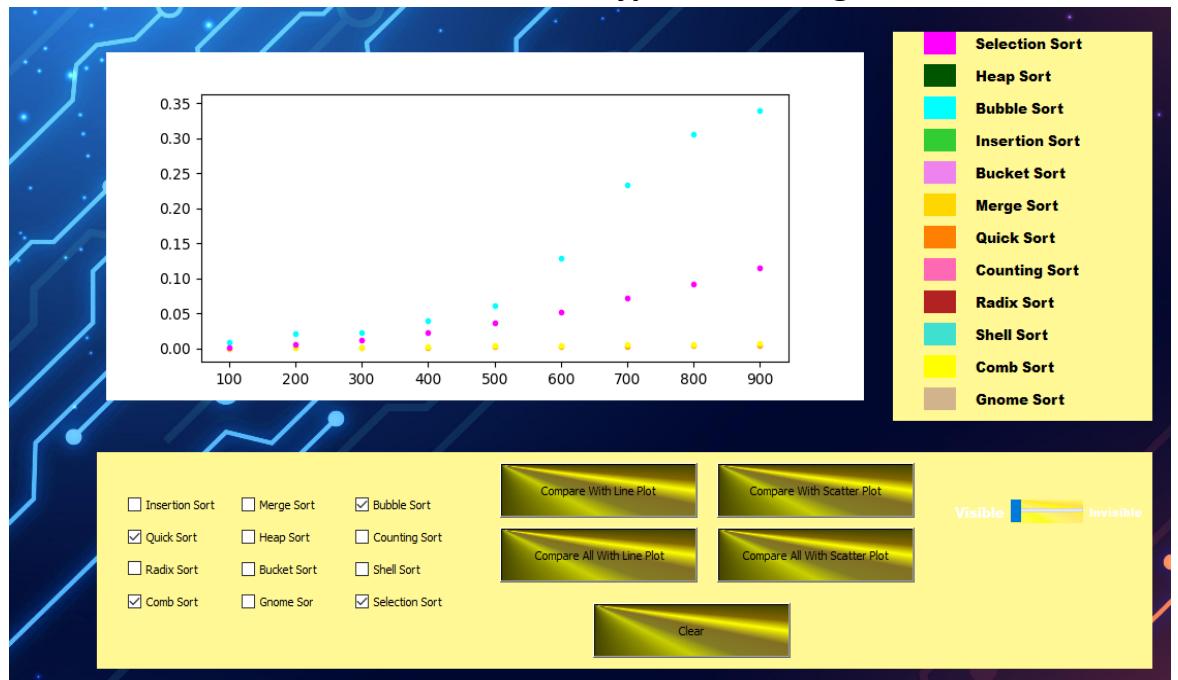
COMPARISON PAGE:



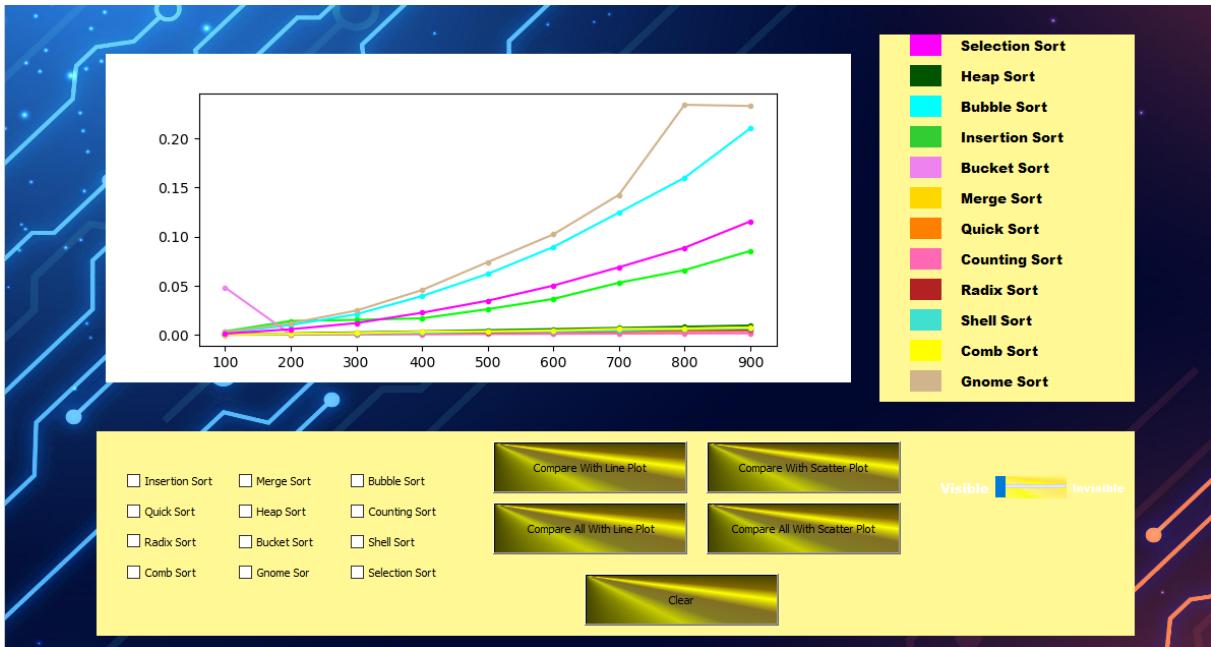
- ❖ On this page, it is possible to compare how fast the sorting types are sorted with the asymptotic graphs. Which sorting types are to be compared should be marked and then user should select graph type and enter the related button. User can select 2 types of plots; one of them is line plot and the other one is scatter plot. If all types are wanted to be sorted, comparison can be made by pressing the "Compare All" button with selected type of graph. When the "Clear" button is pressed, the graph will be cleared. When the graphic is set to invisible, the graphic closes and a gif describing the subject appears instead.



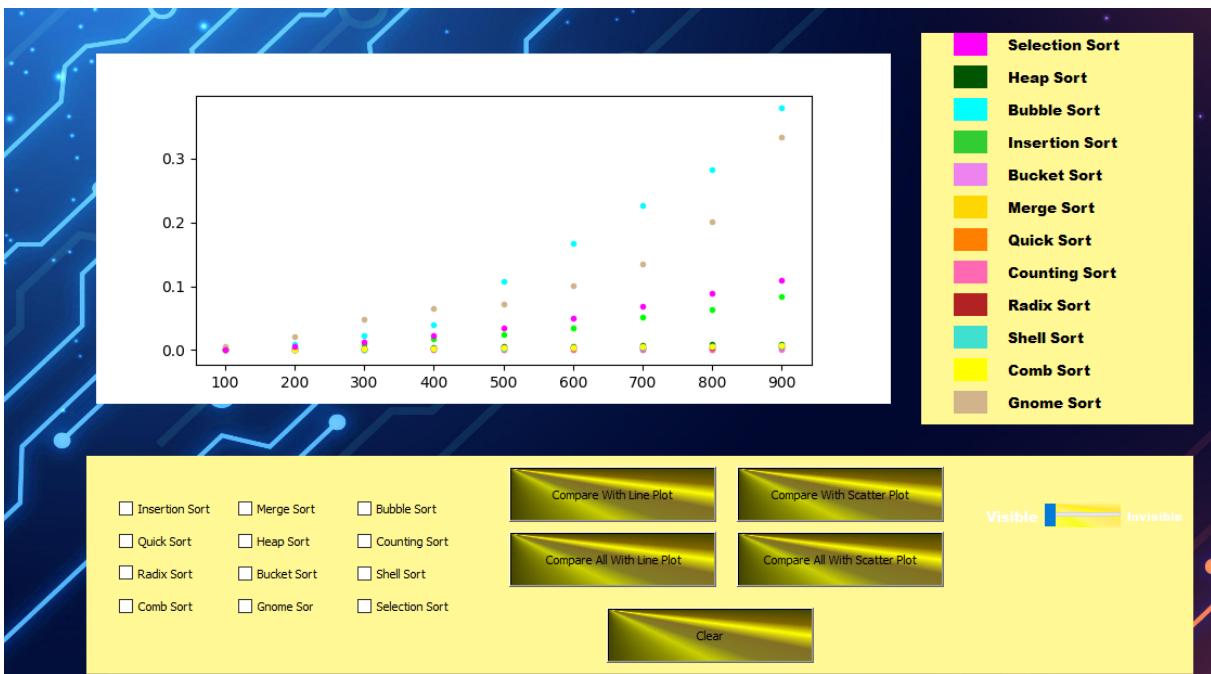
Line Plot With Selected Types Of Sorting



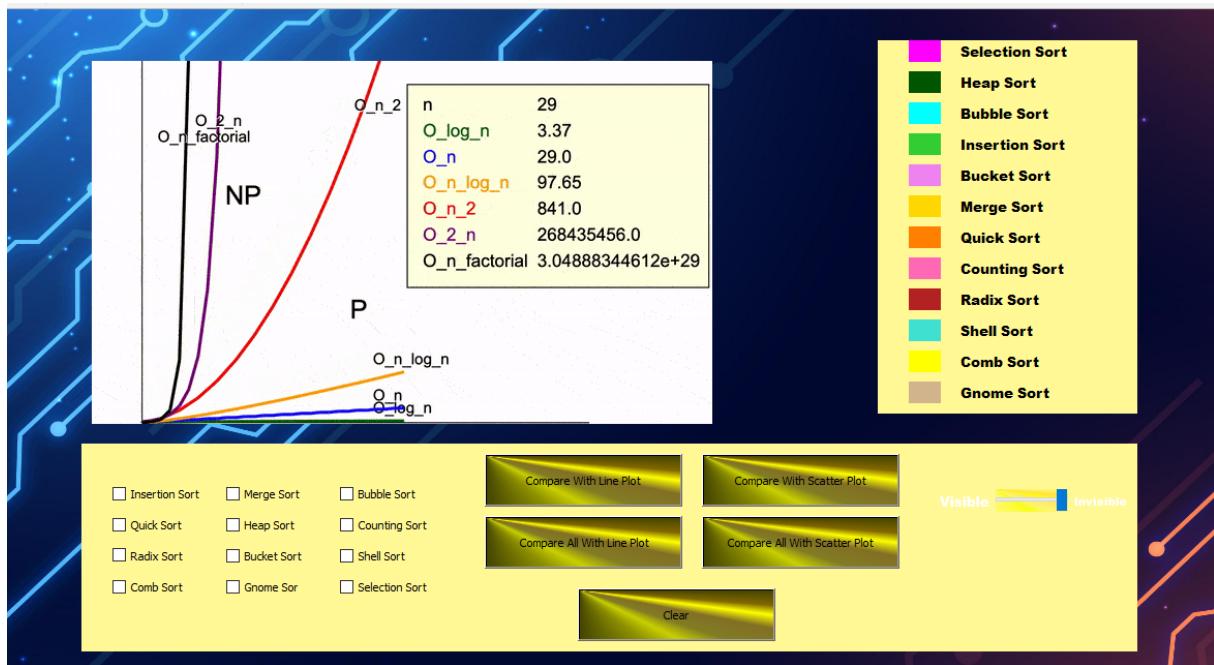
Scatter Plot With Selected Types Of Sorting



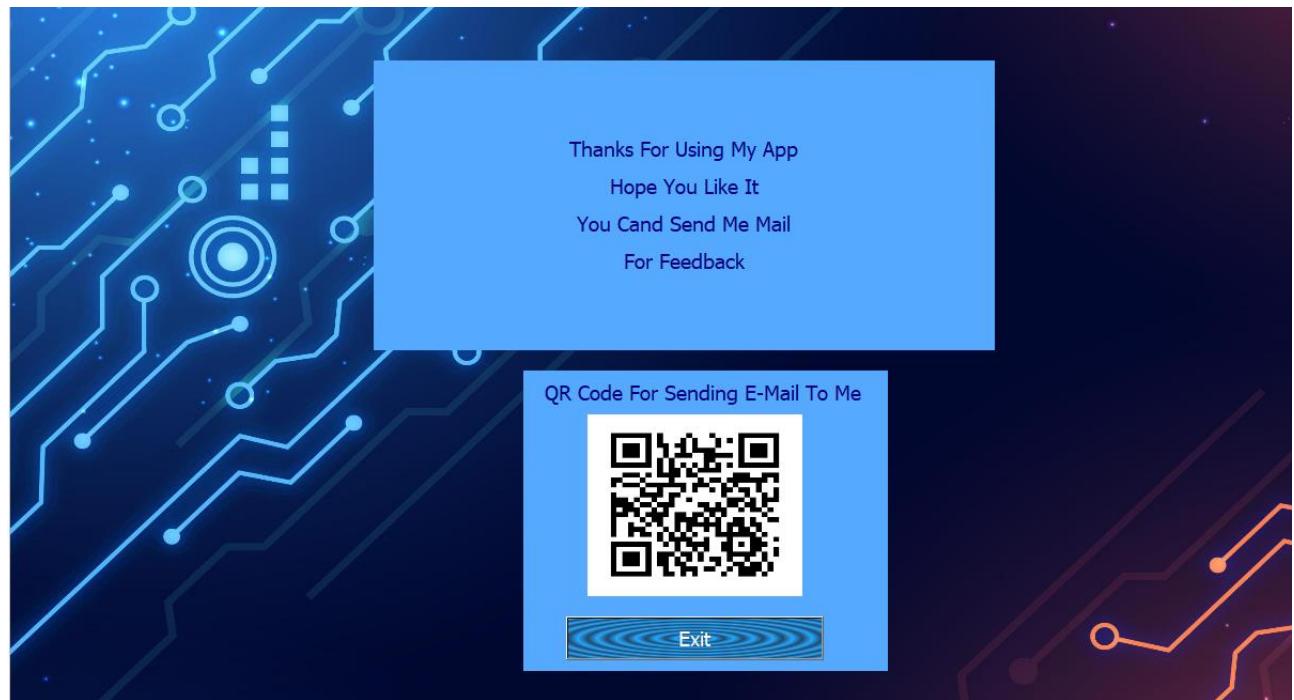
Compare All With Line Plot



Compare All With Scatter Plot



EXIT PAGE:



- ❖ The user can access this page when he/she wants to leave the application. With the help of the exit button on this page, they can close the application completely, or they can close the application by pressing the button after they send me their opinions about the application by sending me a direct e-mail by scanning the QR code that appears on the screen.