

Lab assignment 8

- Develop a program to multiply two matrices. The program should check if the dimensions are compatible for multiplication. The output must be formatted properly as a matrix.
- Develop a program to obtain a submatrix from a matrix. The user inputs an $m \times n$ matrix A , and also provides the integers r_b, r_e, c_b, c_e , such that $r_b, r_e \leq m$ and $c_b, c_e \leq n$. The submatrix is $A[r_b:r_e, c_b:c_e]$.

For example, if A is the 4×5 matrix

```
1 4 5 6 1
3 5 6 1 6
5 2 7 1 9
9 1 6 1 0
```

`submatrix(A, 1, 3, 3, 4)` returns

```
1 6
1 9
1 0
```

- Develop a program to find a particular element z in an $m \times n$ matrix A . The output is a binary $m \times n$ matrix B , where

$$B[i, j] = 1 \text{ if } A[i, j] = z,$$
$$= 0 \text{ otherwise.}$$

For example, `find(A, 4)` for the input A

```
3 4 0
2 0 4
1 1 6
```

gives B :

```
0 1 0
0 0 1
0 0 0
```

- Develop a terminal-based program to plot mathematical functions, using an $M \times N$ character array B . Assume $y = f(x)$. Assign an enable character for $B[y, x]$, and a disable character (like a blank) for all other values of B . Then display B on the terminal. You can plot multiple functions simultaneously by assigning a different enable character for different $f(x)$. For example, $f_1(x) = \sin(x)$, $f_2(x) = \log(x)$.

Note: You will need to round off values of $f(x)$ to form valid array indices. Experiment with different values of M and N , so that the whole screen is utilized for plotting.