Lab 5 – Strings; File Input/Output.

5.1 Time Table

Specify function **`M = times_table(k)`** that returns the times table of the first **`k`** integers in the form of the square matrix **`M`**.

5.2 Write File with Times Table

Specify function **`res = write_times_table(filename, M)`** that writes matrix **`M`** as a time table into a text file with name "**`filename`**" with some additional information, namely

- **Line 1**: a string that explains that the following is a times table up to number **k**.
- **Line 2**: left blank
- **Line 3**: a line with chars "+" and "+" that delimit the row of input numbers and allowing 4 initial spaces
- **Line 4**: a line with input numbers 1 to k, each occupying 4 chars, and delimited by "|" chars (also allowing 4 initial spaces).
- **Line 5**: Similar to line 3 bt with initial horizontal line with characters "+" and "-".
- numbers from **1** to **k**
- **Lines 6 to 6+k-1**: A line starting with numbers **1** to **k**, delimited by "|"s followed the corresponding rows of the table, each number taking 4 chars and finishing with the "|" delimiter.
- **Line 6+k+2:** As line 5.

```
This is the times table with the first 5 integers


    +--------------------+
    |  1   2   3   4   5 |
+---+--------------------+
| 1 |  1   2   3   4   5 |
| 2 |  2   4   6   8  10 |
| 3 |  3   6   9  12  15 |
| 4 |  4   8  12  16  20 |
| 5 |  5  10  15  20  25 |
|---+--------------------+
```

5.3. Read File with Times Table

Specify function **M = read_times_table(filename)** that reads a file with the above format from file with "filename" and returns the corresponding times table in matrix M. Use for testing, the file produced in the previous exercise but change some of its values. Can you change the number of characters for representing the numbers?

5.4. Write / Read File with Times Table

Adapt the functions of the previous two problems to read/write a file with a times table but where there are no delimiters and the different data items are separated by single space characters, as shown below.

```
This is the times table with the first 5 integers
1 2 3 4 5
1 1 2 3 4 5
2 2 4 6 8 10
3 3 6 9 12 15
4 4 8 12 16 20
5 5 10 15 20 25
```