

COMP242-Project II

In this project, you will implement an equation processor application using **linked stack** and **cursor array implementations** of a linked list. The equation processor interface will look like the following:

File: c:\data\DS-Proj2.242
Load

Equation-Section

Infix:

* 5 + 30 ==> 5 30 + ==> 35

* 5 + 3 * 4.5 ==> 5 3 4.5 * + ==> 18.5

* (15 + 3) * (4 ^ 2) ==> 15 3 + 4 2 ^ * ==> 288

Postfix:

* 2 30 4 * + ==> +2 * 30 4 ==> 122

Prev
Next

The equation file is a special text file that has a **.242** extension. The equations in this file are in **infix** and/or **postfix** format. A typical equation file looks like the following:

The equations file has to start with the tag **<242>** and ends with the tag **</242>**. Within the start and end tags there are 1 or more sections. **Section** starts with **<section>** tag and ends with **</section>** tag. Within a section there are an optional **infix** and/or **postfix** sections. **Infix** starts with **<infix>** tag and ends with **</infix>** tag. **Postfix** starts with **<postfix>** tag and ends with **</postfix>** tag. Inside the infix/postfix sections you find 1 or more equations. **Equation** starts with **<equation>** tag and ends with **</equation>** tag.

```

DS-Proj2.242 - Notepad
File Edit Format View Help
<242>
  <section>
    <infix>
      <equation>5 + 30</equation>
      <equation>5 + 3 * 4.5</equation>
      <equation>( 15 + 3 ) * ( 4 ^ 2 )</equation>
    </infix>
    <postfix>
      <equation>2 30 4 * + </equation>
      <equation>3 4 * 2 5 * + </equation>
      <equation>12 3 - 4 + 5 6 * - </equation>
      <equation>2.5 3 - 4 + 5 6 7 * + * </equation>
    </postfix>
  </section>
  <section>
    <infix>
      <equation>( 2 - 3 + 4 ) * ( 5 + 6 * 7 )</equation>
      <equation>2 - 3 + 4 - 5 * 6</equation>
    </infix>
    <postfix>
      <equation> 10 2 8 * + 3 - </equation>
      <equation> 2 3 1.5 * + 9 - </equation>
    </postfix>
  </section>
</242>
Ln 9, Col 24    60%    Windows (CRLF)    UTF-8
  
```

At start, the user has to click the **Load** button. The load button will open a **file chooser** to select an equation file. The selected file will be displayed in the label next to the load button (e.g. c:\data\DS-**Proj2.242**) and then the file contents will be loaded as shown in **previous figure** **if the file is valid**(e.g. tags are balanced) .

- **Valid file**: you need to check and indicate whether the file tags are **balanced** or not. Meaning that each **start tag** has an **end tag** and they are closed in order.

Note: This can be done using a stack similar to the balanced delimiters in equations.

- In the **Equation Section** you need to load equations from the 1st section from the file.
 - For **Infix** equations: do convert the infix to postfix and then evaluate it.
 - For **postfix** equations: do convert the postfix to **prefix** and then evaluate it. As shown in the previous figure.

Note: we didn't cover prefix in lectures. You need to study it by yourself.

- At last, the **Prev** and **Next** buttons will navigate through equation section. If you click the **Next** button, it will display the equations from the 2nd section in the file if exists and so on. If you click the **Prev** button, it will display the equations from the previous section in the file if exists.

To make the project more interesting:

- We need you to implement the linked stack using a cursor array.
- You have to define **1** course array and within this cursor array you can create as many stacks as needed.

Yahoooo!

Good Luck!