Lassonde School of Engineering

Dept of EECS

EECS 2032

LAB 6

Lab Objectives

To use functions that reads and writes from/to a file

Problem 1

A database file contains binary data (Check the sample data at the end of this document). The file contains a number of records, each record is stored as a "struct".

```
struct employee {
     int Employee_ID;
     char name [20]; // Employee name first name then last name
     char address[50]; //The employee address might contains spaces
                       //Both name and address are terminated by
                       //a null character
     int job_code; // An integer between 1 and 12
     float salary;
 }
```

The struct is written to the file using fwrite. The sample data contains one record with the following values.

123456, John Smith, 70 main St. Toronto, ON M3M 3M3, 9, 73123.45

Write a C program that performs the following

- The file name is **lab6_1.c**
- The file takes command line parameters (argc and argv)
- If the command line arguments "-ID" followed by an integer, look for an employee with that ID in the file. If that ID exists, print the name on a line by itself. If There is no such ID print "No such employee" on a line by itself.

- If the arguments “-s” followed by a number, prints the names and salaries of the employees with a salary that is equal to or greater than that number followed by a comma, then the employee salary, for example

```
John Smith, 73123.45
```

- If the arguments is “-count” print the number of employees in the file
- If the arguments are “-name” followed by a name that may contains spaces, look for an employee with the same name and display his/her salary. If no such employee exist, display “No such employee”
- The quotes surrounding the arguments is for illustrative purpose only, they are not part of the input data, for example the actual input could be

```
a.out –s 1234.56
```

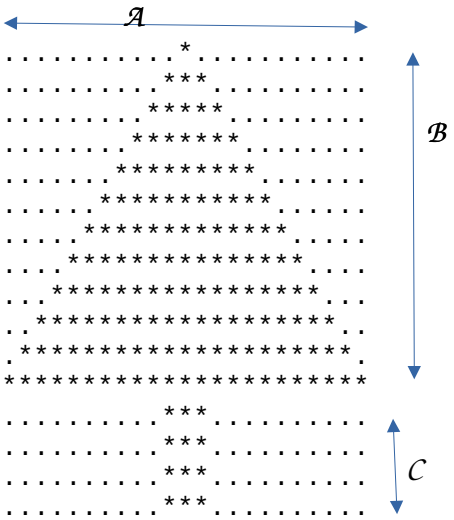
- every displayed line ends with ‘\n’

Exercise: Practice Problems (Do not submit)

1. Read a square matrix and calculate if it is symmetric or not.
2. Read a matrix and display the transpose of the matrix
3. Simulate the game of life (google the game of life first). Your program should read the initial matrix, and prints the matrix after every step for at least 5 steps
4. Read a string. If the string contains three consecutive letters in the alphabet in consecutive positions, display YES, else display No. this is case insensitive, so aB are considered consecutive. For example the string “ghkloFghzcd” contains “Fgh” then display YES
5. Read a string and check if the string is a palindrome or not (a palindrome is a phrase that is read the same forward and backward, for example like “radar” or “level”. First assume that there are no spaces in the string. Then assume that the string is made of words separated by one or more space between them for example “taco cat”
6. Encode a file with a secret key. Write a program that reads a text file. Then it encrypts it and store the encrypted version in another file. Encryption is a huge subject, here you can use an easy way to encrypt. be creative, you can go from reading the file byte (or any other size) by a byte and XOR the read data with the key, all the way to AES (do not really recommend it, very difficult). Your program should read the name of the text file, and the key, then perform the encryption
7. Write a program to decrypt the file you encrypted in the previous question. You input the decrypted file and the key, you get the original file.
8. Write a program that displays the following (read the number of lines).

```
*
.*
..*
...*
....*
.....*
......*
```

9. Write a program to display this picture. Your program should be parametrized in terms of width, stem length and leafs height.



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The sample data for LAB 6 contains the following two records. You can add more to this and use.

1256
John Doe
123 main st.
8
1000.000000

4444
Jane Doe
78 Keele St.
9
2000.000000

123456
John Smith
70 main St. Toronto, ON M3M 3M3
9
73123.45

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