**PRACTICAL EXERCISE 1 – IT4062E**

Submitting requirements:

* Use Makefile to compile your source code
* Encapsulate all source code and makefile to a compress file naming with the following format Name\_StudentID\_HW1.zip. Example: NguyenVanA\_20161234\_HW1.zip
* Submit your file to the equivalent assignment on Team

**Exercise 1. Toxic chemicals**

***Create a Makefile to make an executable file with the name* exercise1**

**Description:** One of the most important problems while dealing with fire or emergency is knowing the chemical types. Therefore, vehicles carrying toxic chemicals or factories need to display warning signs. These signs show the HAZCHEM code with 2-3 characters providing necessary information to deal with fire or use suitable fire extinguishers. A HAZCHEM code describes materials/tools needed to handle chemicals and protective clothes for the work. Additionally, these codes provide corresponding chemical to neutralize or extinguish toxic chemicals.

Each HAZCHEM contains 2-3 characters. The first character is a number ranged from 1-4 indicating chemical form,

|  |  |
| --- | --- |
| **1** | Jets |
| **2** | Fog |
| **3** | Foam |
| **4** | Dry agent |

The second character indicates chemical characteristics, protective clothes and whether the chemicals need to be contained. Second character could be P, R, S, T, W, X, Y or Z. Character S, T, Y or Z could have the color of white or black. The following table indicates character and reference to necessary information

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Reactivity** | **Protection** | **Containment** |
| **P** | V | Full | Dilute |
| **R** |  |
| **S** | V | BA |
| **S** | BA for fire only |
| **T** |  | BA |
| **T** | BA for fire only |
| **W** | V | Full | Contain |
| **X** |  |
| **Y** | V | BA |
| **Y** | BA for fire only |
| **Z** | V | BA |
| **Z** | BA for fire only |

Interactive:

V – can be violently reactive

Protective :

Full – full protective clothing must be worn

BA – breathing apparatus, protective gloves for fire only

Containment:

Dilute – the dangerous goods may be washed down to a drain with a large quantity of water

Contain – a need to avoid spillages from entering drains or water courses.

The third character in a HAZCHEM code (if had) indicates whether evacuation is needed.

|  |  |
| --- | --- |
| E | Consider Evacuation |

Emergency actions need to be done according to HAZCHEM codes.

**Requirements:** Write a problem asking users to input a HAZCHEM code and show emergency actions to the screen. If a user input one of S, T, Y, or Z character, that user need to give the color of the code.

Note: The program needs to check the validity of the input HAZCHEM. The following lines are an example of running that program

Enter HAZCHEM code: **3SE**

Is the S reverse coloured? **yes**

\*\*\*Emergency action advice\*\*\*

Material: foam

Reactivity: can be violently reactive

Protection: breathing apparatus, protective gloves for fire only

Containment: may be diluted and washed down the drain

Evacuation: consider evacuation

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**Exercise 2. Processing student grades**

***Create a Makefile to make an executable file with the name* exercise2**

**Description**: Grading information of a class is stored in a text file having the name of semester ID and subject ID. The file contains the following fields and information:

* One line is the subject ID (with the title “SubjectID”)
* One line is the subject’s name (with the title “Subject”)
* One “F” line provides the percentage of progress and final exam marks (%)
* Some line is the semester code (with the title “Semester”)
* One “StudentCount” line indicates the total number of students in the class (remaining lines in that file)
* After that, each line starts with “S” character and then contains information of student ID, full student name, component marks (progress and final exam, 10-point scale), and grades (according to the following table)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Grading | A | B | C | D | F |
| Marks | 8.5-10 | 7.0 - under 8.4 | 5.5 - under 7.0 | 4.0 - under 5.5 | 0 - under 4.0 |

Delimiter character between fields is “|”

Example of a subject with the ID of IT4062 naming IT4062\_20151.txt is as followed:

SubjectID|IT4062

Subject|Network Programming

F|30|70

Semester|20151

StudentCount|4

S|20101160|NGUYEN VAN |AN | 8.5 | 7.0 | B |

S|20191182|TRAN QUOC |BO | 10.0 | 9.0 | A |

S|20111191|LE BANG |CHAN | 5.5 | 4.5 | D |

S|20101216|NGUYEN VAN |DUONG | 8.5 | 8.5 | A |

The grading summary was calculated and stored in a file having a name with the following format <Subject ID>\_<semester ID>\_rp.txt. Here is an example file

IT4062\_20171\_rp.txt

The student with the highest mark is: TRAN QUOC BO

The student with the lowest mark is: LE BANG CHAN

The average mark is: 7.51

A histogram of the subject IT4062 is:

A:\*\*

B:\*

C:

D:\*

F:

Where number of \* represents the number of students getting that grade.

If there are multiple students getting the highest/lowest grade, only show the name of the first student

**Requirement:** Write a problem to show a menu as followed and implement the according functions

Learning Management System

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1. Add a new score board

2. Add score

3. Remove score

4. Search score

5. Display score board and score report

Your choice (1-5, other to quit):

**Using link-list to store information of students read from text files.**

− Function 1: Add a new score board of a subject in a semester. Information typed from keyboard should be subject information, semester ID, and the number of students

− Function 2: Add marks of a student of a specific subject. Users should provide subject ID and semester ID before adding student information and marks to the right text file

− Function 3: Delete the grade of a student of a subject. Again, users should provide correct subject ID, semester ID and student ID.

− Function 4: Find grade information of a student in a subject.

− Function 5: Show the score board and score report of a subject.

After each function, program needs to ask users whether they want to continue or not. If they type ‘y’ or ‘Y”, continue that function. If not, back to the main menu.