National Taiwan Normal University
CSIE Programming II

Instructor: Po-Wen Chi
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Assignment 3

Policies:

- Zero tolerance for late submission.
- You need to prepare a README file about how to make and run your program. Moreover, you need to provide your name and your student ID in the README file.
- For the writing assignment, I only accept pdf. MS. doc/docx format is not acceptable. Moreover, please use Chinese instead of English except foreign students.
- Do not forget your Makefile. For your convenience, each assignment needs only one Makefile. Please put all executable programs in the directory the same with your Makefile.
- The executable programs should be hw0301, hw0302 ....
- You should pack your homework in one zip file. The file name should be StudentId_hw02.zip.

3.1 LRC Player (20 pts)

LRC (short for LyRiCs) is a computer file format that synchronizes song lyrics with an audio file. You can find its format in the wikipedia.
https://en.wikipedia.org/wiki/LRC_(file_format)
Noe I want you to develop a lrc player.

```
$ ./hw0301
Open a LRC file: phantom.of.the.opera.lrc
```

After 20.07 seconds,

```
$ ./hw0301
Open a LRC file: phantom.of.the.opera.lrc
In sleep he sang to me,
```

After 3.64 seconds,

```
$ ./hw0301
Open a LRC file: phantom.of.the.opera.lrc
In sleep he sang to me,
in dreams he came ...
```

Your program should support the following features:

- If the file name extension is not ”lrc”, give a warning message and terminate your program directly.
- Colorize these lyrics according to the characters. I guarantee that there will be no more than eight characters in a lrc file. You can determine the colors yourself except black and white.

You can now enjoy your program with the music.

3.2 Football Table

I like football game and I will never call it soccer. English Premier League is one of the most popular football league in this world. Now I want you to develop a program to do some football game analysis. Your program needs to get a file name from a user. The file will be the football of the whole season. I give you an example: **season-1617_csv.csv**. You can use a text editor to open it. Please reference information.png to read data. Please parse the football data.

After reading the given file, your program should display a menu. Each choice is a feature and you need to go back to the menu after you finish the task except the quit choice. The menu should be like this:

```
$ ./hw0302
Please open a season record: season-1617_csv.csv
1) Who is the winner in this season?
2) Which team gets the most scores?
3) Which team gets the most red cards?
4) Which team wins the most games at home?
5) Which team wins the most games away from home?
6) Which game has the most scoring gap?
7) Team information.
8) Exit
Choice (1-7, 8:exit): 1
The winner is Chelsea.
Choice (1-7, 8:exit): 2
Tottenham, 86
Choice (1-7, 8:exit): 3
Sunderland, 12 <I do know the answer>
Choice (1-7, 8:exit): 4
Liverpool, 10 <I do know the answer>
Choice (1-7, 8:exit): 5
Man United, 10 <I do know the answer>
Choice (1-7, 8:exit): 6
2017-05-21,Hull(1) vs Tottenham(7)
Choice (1-7, 8:exit): 7
Team: Arsenal
Points: 75
```

```
Win/Draw/Lose: 23/6/9
Goals Scored/Goals Against: 77/44
```

Some Common Sense about Football :

1. The winning team will get 3 points and the losing team gets nothing. As for the draw game, both teams will get 1 point.
2. There are total 20 teams in the Premier League.
3. There are total 380 games in one season.
4. Because of Promotion and Relegation, the team list is different for every season.

3.3 BMP Distortion

I want you to develop a program to distort a BMP file with a given angle.

```
$ ./hw0302
Please input a BMP file: doraemon.bmp
Please input the output BMP file name: doraemon_out.bmp
Angle (0-90): 45
```

The distortion is as in figure 3.1.

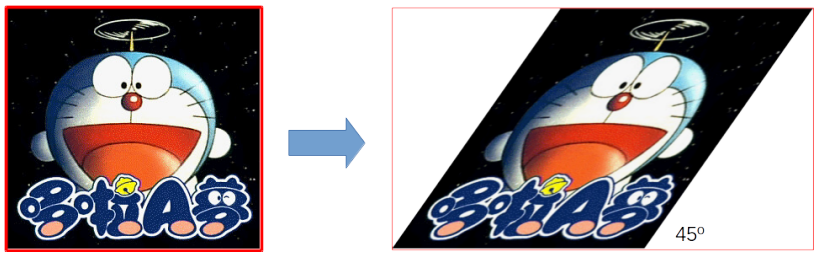

FIGURE 3.1: Distortion Example. Note that the boundary red line should not be presented. The additional part should be colored with white.

3.4 BMP: RGBA

In this class, I have shown you how to process a BMP file. The given example is a Maldives picture, which is a 24-bit pixel BMP file. How about 32-bit pixel? From wikipedia, we can find that there is another element called **Alpha**. What is **Alpha**? Please write down you description.

Moreover, you need to write a program to convert a BMP file with 24-bit depth to a BMP file with 32-bit depth by giving **Alpha** value.

```
$ ./hw0303
Please input a BMP file: doraemon.bmp
Please input the output BMP file name: doraemon_out.bmp
Alpha (0-31): 20
```

If the input BMP is not a 24-bit depth, print a warning message and terminate the program.

Please remember that this problem includes a program and a writing note.

3.5 Game Cheater: SAN5PK

After lots of midterm exams, now it is the time to enjoy your happy life. As your teacher, I also want you to be relaxed. So I ask you to play a MS Dos game. So you need to install a emulator, **dosbox**, first. Lots of Dosbox tutorials can be found in the google.

The game we want to play is called **SAN5PK**. SAN5PK (三國志 V 威力加強版) is the 5th installment in Koei's Romance of the Three Kingdoms series, which is a series of turn-based tactical role-playing simulation grand strategy wargames. Gameplay revolves around managing numerical statistics, each representing an attribute of a city or a character. A city is described by statistics such as stored grain supplies, vulnerability to disasters such as floods and earthquakes, treasury funds, domestic affairs and populace loyalty. Characters are numerically characterized by their leadership abilities, melee prowess, intellects and loyalty, as well as special traits or even magical abilities that can be called upon whether during wartime, diplomacy or domestic affairs. Players can increase these numbers before waging war on neighbouring territories or intending diplomatic efforts. The above content is from wikipedia.

You can download from the following URL:
https://dos.zczc.cz/games/%E4%B8%89%E5%9B%BD%E5%BF%975X/

If you do not know how to play, ask our TAs.

Your programming teacher, Po-Wen Chi, is a terrible player. I always lose in this game. So I want you to help me to develop a game **savefile** cheater, which can modify the information of characters, cities and countries. I use red line to circle the information that I want you to modify in figure 3.2.

This time, there is no interface instruction. You need to design your own interface and prepare a good tutorial for TAs. If TAs do not know how to use your program ... Good Luck.

FIGURE 3.2: Your program should make the user modify these values.

3.6 Bonus: Do Not Use IF (5 pts)

Please read the following code first.

```
#include <stdio.h>
#include <stdint.h>

void max( int32_t a, int32_t b )
{
    if ( a >= b )
    {
        printf( "%d", a );
    }
    else
    {
        printf( "%d", b );
    }
    return;
}
```

It is simple, right? Now I want you to rewrite this code, but **YOU CANNOT USE ANY CONDITIONAL BRANCHES!**. Trust me, I know what conditional branch is. So do not challenge me like "I do not

use if, I use while or for or switch case ...".

Hint: Bitwise operation is your friend. You may get the answer from the bonus question in your last homework.