DESCRIPTION OF COURSEWORK

Course Code	CST103
Course Name	Programming in language C
Lecturer	Prof. Li Xiaochao/Prof. Yang Chenhui
Academic Session	202309
Assessment Title	Assignment

A. Introduction/ Situation/ Background Information

This course provides a thorough introduction to the C programming language. It will cover basic syntax, grammar and topics . It aims to impart the practical programming techniques to the students.

B. Course Learning Outcomes (CLO) covered

CLO 3 Propose solutions to common safe programming practice

CLO 4 Practice C programming in an ethical manner i.e. without causing software bugs

C. University Policy on Academic Misconduct

1. Academic misconduct is a serious offense in Xiamen University Malaysia. It can be defined as any of the following:
   i. **Plagiarism** is submitting or presenting someone else's work, words, ideas, data or information as your own intentionally or unintentionally. This includes incorporating published and unpublished material, whether in manuscript, printed or electronic form into your work without acknowledging the source (the person and the work).
   ii. **Collusion** is two or more people collaborating on a piece of work (in part or whole) which is intended to be wholly individual and passed it off as own individual work.
   iii. **Cheating** is an act of dishonesty or fraud in order to gain an unfair advantage in an assessment. This includes using or attempting to use, or assisting another to use materials that are prohibited or inappropriate, commissioning work from a third party, falsifying data, or breaching any examination rules.

2. All the assessment submitted must be the outcome of the student. Any form of academic misconduct is a serious offense which will be penalised by being given a zero mark for the entire assessment in question or part of the assessment in question. If there is more than one guilty party as in the case of collusion, both you and your collusion partner(s) will be subjected to the same penalty.

D. Instruction to Students

This assignment is an individual assignment. Each student should submit a zip file "YourStudentID.zip" to Moodle. The submission should include the following:

- The source codes (For each question there should be a .c file. i.e. Question1.c)
- Executable file (there should be a .exe file). The executable file of your code can be found in the project path\bin\Debug\
- A PDF with Assignment Cover Page should include the screenshots of the output as well as an explanation (comments) of your complex codes and output.
- The deadline for Assignment is 23:59, 24nd Oct., 2023 Overdue penalty will be given to the assignment that is submitted after the deadline.

Submission type: Softcopy in Moodle system

Submission due date: Oct. 24th, 2023

E. Evaluation Breakdown

No.	Component Title	Percentage (%)
1.	D. Instruction to Students	1
2.	Coding style	1
3.	Question 1	3
4.	Question 2	5
	TOTAL	**10**

F. Task(s)

Attention: All the answers should implement **your own algorithms**. In your answer to all of the following exercises, appropriate comments should be provided for obscure or difficult code.

Question 1: Write a program that reads input until encountering #. Have the program print each input character and its ASCII decimal code. Print eight character-code pairs per line. Suggestion: Use a character count and the modulus operator (%) to print a newline character for every eight cycles of the loop.

Question 2: Based on the 4.9 Grading System in XMUM student handbook, A student's performance in a course is represented by the grade they obtain. The table below lists the total marks, corresponding grades, and grade points.

Marks	Grade	Grade Points	Description
85 - 100	A	4.00	Distinction
80 - 84	A-	3.70	Distinction
75 - 79	B+	3.30	Good
70 - 74	B	3.00	Good
65 - 69	B-	2.70	Good
60 - 64	C+	2.30	Pass
55 - 59	C	2.00	Pass
50 - 54	C-	1.70	Conditional Pass
45 - 49	D+	1.30	Fail
40 - 44	D	1.00	Fail
≤ 39	F	0.00	Fail

The Grade Point Average (GPA) is calculated at the end of each semester and represents the average grade achieved by a student in that particular semester. The formulas used for calculating the Grade Point Average (GPA) as follows:

$$\text{GPA} = \frac{\Sigma\ (\text{credits attempted for each course} \times \text{grade point awarded for the course})}{\text{The total credits attempted in a semester}}$$

Write a GPA calculator that was programmed using the C programming language. The program ask the user for input 5 courses marks that your take in this semester and do the calculation based on the above formula and table, output the final GPA and related info for the grades entered. The final output format as following:

Couse code Final mark Grade Grade Points Description

Course #1

…..

Course #5

The GPA of 202309 semester:

Course Code	:	CST103
Course Name	:	Programming Language C
Lecturer	:	Prof. LI Xiaochao/Prof. Yang Chenhui
Academic Session	:	202309
Assessment Title	:	Assignment
Submission Due Date	:	24th Oct. 2023

Prepared by :

Student ID	Student Name
CYS2309198	JIANG LETIAN

Date Received : 24/10/2023

Feedback from Lecturer:

Mark:

Own Work Declaration

I/We hereby understand my/our work would be checked for plagiarism or other misconduct, and the softcopy would be saved for future comparison(s).

I/We hereby confirm that all the references or sources of citations have been correctly listed or presented and I/we clearly understand the serious consequence caused by any intentional or unintentional misconduct.

This work is not made on any work of other students (past or present), and it has not been submitted to any other courses or institutions before.

Signature: 江乐天

Date: 24/10/2023

APPENDIX 1

MARKING RUBRICS

Component Title	**Question 1 and 2,**				**Percentage (%)**		
Criteria	**Score and Descriptors**					**Weight (%)**	**Marks**
	Excellent (5)	**Good (4)**	**Average (3)**	**Need Improvement (2)**	**Poor (1)**		
D. Instruction to Students	Meet all the requirement, nice format	Meet most the requirements with clear format	Meet half of the requirements with clear format	Meet less than half of the requirement	Just meet small part of requirement and the format is bad	**1**	
Coding style	Nice Indentation and appropriate comments in the code	Most of the indentation and comments are ok	Minor misalignment and style issue	Some misalignment and style issues	Not following the style	**1**	
Q1 Code Correctness	Pass all test cases without software bug.	Pass some of the test cases.	Code seems to be complete with compile errors.	No/Incomplete Code	Code Correctness	**3**	
Q2 Code Correctness	Pass all test cases without software bug.	Pass some of the test cases.	Code seems to be complete with compile errors.	No/Incomplete Code	Code Correctness	**5**	
					TOTAL	**10**	

Note to students: Please print out and attach this appendix together with the submission of coursework

Output of Question_1

```
Last login: Mon Oct 23 16:59:11 on ttys010
a111@MacBook-Pro ~ % /Users/a111/Library/Mobile\ Documents/com\~apple\~CloudDocs
/XMUM/C\ programing\ /15/Question\ 1/Question_1 ; exit;
input your string here (# to quit):
dugovqgbjkfbsdmnf
d to ASCII: 100
u to ASCII: 117
g to ASCII: 103
o to ASCII: 111
v to ASCII: 118
q to ASCII: 113
g to ASCII: 103
b to ASCII: 98

j to ASCII: 106
k to ASCII: 107
f to ASCII: 102
b to ASCII: 98
s to ASCII: 115
d to ASCII: 100
m to ASCII: 109
n to ASCII: 110

f to ASCII: 102
input your string here (# to quit):
1298787461383243
1 to ASCII: 49
2 to ASCII: 50
9 to ASCII: 57
8 to ASCII: 56
7 to ASCII: 55
8 to ASCII: 56
7 to ASCII: 55
4 to ASCII: 52

6 to ASCII: 54
1 to ASCII: 49
3 to ASCII: 51
8 to ASCII: 56
3 to ASCII: 51
2 to ASCII: 50
4 to ASCII: 52
3 to ASCII: 51

input your string here (# to quit):
$*(#&^({>:#:>"@"::+_#"?'.;}{:>":":>
$ to ASCII: 36
* to ASCII: 42
( to ASCII: 40
# to ASCII: 35
& to ASCII: 38
^ to ASCII: 94
```

```
( to ASCII: 40
{ to ASCII: 123

> to ASCII: 62
: to ASCII: 58
# to ASCII: 35
: to ASCII: 58
> to ASCII: 62
" to ASCII: 34
@ to ASCII: 64
" to ASCII: 34

: to ASCII: 58
: to ASCII: 58
+ to ASCII: 43
_ to ASCII: 95
# to ASCII: 35
" to ASCII: 34
? to ASCII: 63
' to ASCII: 39

. to ASCII: 46
; to ASCII: 59
} to ASCII: 125
{ to ASCII: 123
: to ASCII: 58
> to ASCII: 62
" to ASCII: 34
: to ASCII: 58

" to ASCII: 34
: to ASCII: 58
> to ASCII: 62
input your string here (# to quit):
#
Thank you!

Saving session...
...copying shared history...
...saving history...truncating history files...
...completed.

[进程已完成]
```

```c
#include<stdio.h>
#include<string.h>
// For strcmp(),strcpn()

int main()
{
    char ch [200] ;
    do{
        printf ( "input your string here (# to quit):\n" ) ;
        scanf ( "%s" , ch ) ;

        // Check if the input is "#", and if so, exit the loop
        if ( strcmp( ch , "#") == 0 )
            break ;

        // Remove the newline character from the input
        ch [ strcspn ( ch , "\n") ] = '\0' ;

        for ( int i=0 ; i < strlen(ch) ; i++ ){
            printf ( "%c to ASCII: %d\n" , ch[i] , ch[i] );

            // 8 characters per line
            if ((i + 1) % 8 == 0)
                printf( "\n" ) ;
        }
    }
    while ( strcmp( ch , "#" ) != 0 ) ;
    // Continue processing input until the user enters "#"

    printf ( "Thank you!\n" ) ;
    return 0 ;
}
```

Output of Question_2_use_struct

```
Last login: Mon Oct 23 16:55:17 on ttys010
a111@MacBook-Pro ~ % /Users/a111/Library/Mobile\ Documents/com\~apple\~CloudDocs
/XMUM/C\ programing\ /15/Question\ 2/Question_2_use_struct ; exit;
Input your Marks in Course MPU1.1-I:
98
Input your Marks in Course CYS102:
108
Invalid mark. Please enter a mark between 0 and 100.
Input your Marks in Course CYS102:
76
Input your Marks in Course MPU3192:
54
Input your Marks in Course CYS101:
-39
Invalid mark. Please enter a mark between 0 and 100.
Input your Marks in Course CYS101:
87
Input your Marks in Course CYS103:
54
Input your Marks in Course CST103:
76
Course code  Final mark  Grade  Grade Points  Description
MPU1.1-I         98        A       4.00       Distinction
CYS102           76        B+      3.30       Good
MPU3192          54        C-      1.70       Conditional Pass
CYS101           87        A       4.00       Distinction
CYS103           54        C-      1.70       Conditional Pass
CST103           76        B+      3.30       Good
The GPA of 202309 semester:3.04
Saving session...
...copying shared history...
...saving history...truncating history files...
...completed.

[进程已完成]
```

```c
#include <stdio.h>
#include <string.h>
// For strcpy()

// Define a structure to represent a course
struct Course{
    int Lower, Upper ; // Lower and upper marks for the grade range
    char Grade[6] ;
    float Grade_Points;
    char Description[20] ;
} ;

int main() {
    char Course_Code[6][10] = {
        "MPU1.1-I" , "CYS102" , "MPU3192" , "CYS101" , "CYS103" , "CST103"
    } ; // Arrays to store course information

    int Marks[6] ;
    char Grade[6][3] ;
    float Grade_Points[6] ;
    char Description[6][20] ;

    int Credit[6] = {
        2 , 3 , 2 , 3 , 3 , 4
    } ;
    float GPA = 0 ;

    // Define a table of grade information using the Course structure
    struct Course table[] =
    {
        {85, 100, "A",  4.00, "Distinction"},
        {80, 84,  "A-", 3.70, "Distinction"},
        {75, 79,  "B+", 3.30, "Good"},
        {70, 74,  "B",  3.00, "Good"},
        {65, 69,  "B-", 2.70, "Good"},
        {60, 64,  "C+", 2.30, "Pass"},
        {55, 59,  "C",  2.00, "Pass"},
        {50, 54,  "C-", 1.70, "Conditional Pass"},
        {45, 49,  "D+", 1.30, "Fail"},
        {40, 44,  "D",  1.00, "Fail"},
        {0,  39,  "F",  0.00, "Fail"}
    };

    // Loop to input and process marks for each course
    for ( int i = 0 ; i < 6 ; i++ ) {
        restart :
        printf( "Input your Marks in Course %s:\n" , Course_Code[i] ) ;
        scanf( "%d" , &Marks[i] ) ;

        // Check if marks are valid, else ask for input again
        if( Marks[i] < 0 || Marks[i] > 100 ){
            printf("Invalid mark. Please enter a mark between 0 and 100.\n");
            goto restart ;
        }

        // Find the corresponding grade and grade information
        for ( int j = 0 ; j < 11 ; j++ ) {
            if (Marks[i] >= table[j].Lower
                &&
                Marks[i] <= table[j].Upper) {
                strcpy( Grade[i], table[j].Grade ) ;
                Grade_Points[i] = table[j].Grade_Points ;
                strcpy( Description[i], table[j].Description ) ;
                break ;
            }
        }
    }

    // Display the results
    printf( "Course code  Final mark  Grade  Grade Points  Description\n" );
    for (int i = 0; i < 6; i++) {
        printf("%-8s     m        %-2s     %5.2f       %s\n",
                Course_Code[i], Marks[i], Grade[i], Grade_Points[i], Description[i]);
        GPA += Grade_Points[i] * Credit[i] ;
    }

    // Calculate and display the GPA
    printf("The GPA of 202309 semester:%.2f" ,
            GPA / ( 2 + 3 + 2 + 3 + 3 + 4 ) ) ;

    return 0 ;
}
```

Output of Question_2_use_switch

```
Last login: Mon Oct 23 16:55:45 on ttys010
a111@MacBook-Pro ~ % /Users/a111/Library/Mobile\ Documents/com\~apple\~CloudDocs
/XMUM/C\ programing\ /15/Question\ 2/Question_2_use_switch ; exit;
Input your Marks in Course MPU1.1-I:
65
Input your Marks in Course CYS102:
87
Input your Marks in Course MPU3192:
134
Invalid mark. Please enter a mark between 0 and 100.
Input your Marks in Course MPU3192:
87
Input your Marks in Course CYS101:
-32
Invalid mark. Please enter a mark between 0 and 100.
Input your Marks in Course CYS101:
56
Input your Marks in Course CYS103:
87
Input your Marks in Course CST103:
39
Course code  Final mark  Grade  Grade Points  Description
MPU1.1-I         65        B-      2.70       Good
CYS102           87        A       4.00       Distinction
MPU3192          87        A       4.00       Distinction
CYS101           56        C       2.00       Pass
CYS103           87        A       4.00       Distinction
CST103           39        F       0.00       Fail
The GPA of 202309 semester:2.55
Saving session...
...copying shared history...
...saving history...truncating history files...
...completed.

[进程已完成]
```

```c
#include <stdio.h>
#include <string.h>
// For strcpy()

int main() {
    char Course_Code[6][10] = {
        "MPU1.1-I" , "CYS102" , "MPU3192" , "CYS101" , "CYS103" , "CST103"
    } ; // Arrays to store course information

    int Marks[6] ;
    char Grade[6][3] ;
    float Grade_Points[6] ;
    char Description[6][20] ;

    int Credit[6] = {
        2 , 3 , 2 , 3 , 3 , 4
    } ;
    float GPA = 0 ;

    for ( int i = 0 ; i < 6 ; i++ ) {
        restart :
        printf( "Input your Marks in Course %s:\n" , Course_Code[i] ) ;
        scanf( "%d" , &Marks[i] ) ;

        // Use a switch statement to assign grades and grade points based on marks
        switch (Marks[i]) {
            case 85 ... 100:
                strcpy(Grade[i], "A");
                Grade_Points[i] = 4.00;
                strcpy(Description[i], "Distinction");
                break;
            case 80 ... 84:
                strcpy(Grade[i], "A-");
                Grade_Points[i] = 3.70;
                strcpy(Description[i], "Distinction");
                break;
            case 75 ... 79:
                strcpy(Grade[i], "B+");
                Grade_Points[i] = 3.30;
                strcpy(Description[i], "Good");
                break;
            case 70 ... 74:
                strcpy(Grade[i], "B");
                Grade_Points[i] = 3.00;
                strcpy(Description[i], "Good");
                break;
            case 65 ... 69:
                strcpy(Grade[i], "B-");
                Grade_Points[i] = 2.70;
                strcpy(Description[i], "Good");
                break;
            case 60 ... 64:
                strcpy(Grade[i], "C+");
                Grade_Points[i] = 2.30;
                strcpy(Description[i], "Pass");
                break;
            case 55 ... 59:
                strcpy(Grade[i], "C");
                Grade_Points[i] = 2.00;
                strcpy(Description[i], "Pass");
                break;
            case 50 ... 54:
                strcpy(Grade[i], "C-");
                Grade_Points[i] = 1.70;
                strcpy(Description[i], "Conditional Pass");
                break;
            case 45 ... 49:
                strcpy(Grade[i], "D+");
                Grade_Points[i] = 1.30;
                strcpy(Description[i], "Fail");
                break;
            case 40 ... 44:
                strcpy(Grade[i], "D");
                Grade_Points[i] = 1.00;
                strcpy(Description[i], "Fail");
                break;
            case 0 ... 39:
                strcpy(Grade[i], "F");
                Grade_Points[i] = 0.00;
                strcpy(Description[i], "Fail");
                break;
            // Prompt for input again for an invalid mark
            default:
                printf("Invalid mark. Please enter a mark between 0 and 100.\n");
                goto  restart;
        }
    }

    // Display the results
    printf( "Course code  Final mark  Grade  Grade Points  Description\n" );
    for (int i = 0; i < 6; i++) {
        printf("%-8s     m        %-2s     %5.2f       %s\n",
               Course_Code[i], Marks[i], Grade[i], Grade_Points[i], Description[i]);
        GPA += Grade_Points[i] * Credit[i] ;
    }

    // Calculate and display the GPA
    printf("The GPA of 202309 semester:%.2f" ,
           GPA / ( 2 + 3 + 2 + 3 + 3 + 4 ) ) ;

    return 0 ;
}
```