Name:	QUID:

Midterm Instructions: <u>The midterm is 45 minutes long. Use proper indentation/alignment in your code, the lines of the answer sheets are formatted for this purpose.</u>

Q.1   **[8 POINTS]** Write a program that keeps interacting with the user as long as the user did not choose option 3, which results in exiting the program. The program work this way:

- Displays a MENU with three options: (1) display multiplication table (2) Test me (3) exit. Then asks the user to choose an option.
- When the user chooses the option (1), your program displays the multiplication table of the numbers 1 to 10 in the format below then displays the MENU again and asks the user to choose an option.
- When the user chooses the option (2), your program displays a random multiplication problem and waits for the user to enter the answer. Your program displays "Well done" if the answer is correct or "Wrong answer" if the answer is incorrect. In both cases you program again displays the MENU and asks the user to choose an option.
- When the user chooses the option (3), your program displays the score of the user then exits. The score is the number of correct answers divided by the number of all questions multiplied by 100%.

Sample Output

```
(1) Display multiplication table
(2) Test me
(3) Exit
Choose an option: 1
001  002  003  004  005  006  007  008  009  010

002  004  006  008  010  012  014  016  018  020

003  006  009  012  015  018  021  024  027  030

004  008  012  016  020  024  028  032  036  040

005  010  015  020  025  030  035  040  045  050

006  012  018  024  030  036  042  048  054  060

007  014  021  028  035  042  049  056  063  070

008  016  024  032  040  048  056  064  072  080

009  018  027  036  045  054  063  072  081  090

010  020  030  040  050  060  070  080  090  100

(1) Display multiplication table
(2) Test me
(3) Exit
Choose an option: 2
8 * 9 = 72
Well done.
(1) Display multiplication table
(2) Test me
(3) Exit
Choose an option: 2
6 * 9 = 8
Incorrect answer
(1) Display multiplication table
(2) Test me
(3) Exit
Choose an option: 3
Your score is 50%
```

Q.2   **[7 POINTS]** The sequence **0, 1, 1, 2, 3, 5, 8, 13, 21 …** is known as the **Fibonacci** sequence. The value of *term 0* is **0**, the value of *term 1* is **1**, i.e., f(0)=0 and f(1)=1. The values of the next terms, *term 2, term 3, …etc.*, can calculated by adding the values of the immediate previous two terms. For example,

> *The value of term 2* equals *the value of term 1 + the value of term 0* i.e., f(2)=f(1)+f(0) = 1 + 0 = **1**
> *The value of term 3* equals *the value of term 2 + the value of term 1* i.e., f(3)=f(2)+f(1) = 1 + 1 = **2**
> *The value of term 4* equals *the value of term 3 + the value of term 2* i.e., f(4)=f(3)+f(2) = 2 + 1 = **3**
> *The value of term 5* equals *the value of term 4 + the value of term 3* i.e., f(5)=f(4)+f(3) = 3 + 2 = **5**
> *The value of term 6* equals *the value of term 5 + the value of term 4* i.e., f(6)=f(5)+f(4) = 5 + 3 = **8**
> *…*

Write a program to calculate and display the first **n** terms and their summation for a given value of **n** entered by the user. The program continues to run again until the user enters **-1** for the value of **n**. The sample output below shows a sample of the expected output and its formats.

Hint: To calculate a value of a term, your program should always remember the values of the previous two terms. Initially, you need to have your program to remember the values of the first two terms, which are 0 and 1.

Sample Output

```
Enter a positive integer n or -1 to exit: 0
Sum of the terms 0 to 0 = 0
Enter a positive integer n or -1 to exit: 1
Sum of the terms 0 to 1 = 0 + 1 = 1
Enter a positive integer n or -1 to exit: 7
Sum of the terms 0 to 7 = 0 + 1 + 1 + 2 + 3 + 5 + 8 + 13 = 32
Enter a positive integer n or -1 to exit: -1
```