**International University**

School of Electrical Engineering

**Programming for Engineers Laboratory**

**EE058IU**

**Looping**

**Submitted by**

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Date Performed: Nov 06 2025

Date Submitted: Nov 06 2025

Lab Section: Lab 2

Course Instructor: M. Eng Nguyen Minh Thien

**GRADING CHECKLIST**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Number** | **Content** | **Satisfied?** | **Score** | **Comment** |
| 1 | **Format (max 9%)** | |  |  |
| * Font type | Yes No |  |
| * Font size | Yes No |  |
| * Lab title | Yes No |  |
| * Page number | Yes No |  |
| * Table of contents | Yes No |  |
| * Header/Footer | Yes No |  |
| * List of figures (if exists) | Yes No |  |
| * List of tables (if exists) | Yes No |  |
| * Lab report structure | Yes No |  |
| 2 | **English Grammar and Spelling (max 6%)** | |  |  |
| * Grammar | Yes No |  |
| * Spelling | Yes No |  |
| 3 | **Data and Result Analysis (max 85%)** | |  |  |
| **Total Score** | |  | |  |

Date:

Signature

**TEAM CONTRIBUTION**

|  |  |  |
| --- | --- | --- |
| **Task** | **[Team leader]** | **[Student 2]** |
| **Collaboration** | Organize workload | Proofread report |
| **Lab preparation and experiment** | Set up equipment, test the circuits,  Answer in-class questions | Gather components, build the circuits,  Answer in-class questions |
| **Data analysis** | Perform calculation | Perform simulations |
| **Report writing** | Write fundamental background | Write experiment procedure |

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**Discussion of Fundamentals**

In this section, describe the fundamental knowledge of the topic in this lab section. For example:

**Experimental Procedure**

Describe your problems here. Then, you should use flow chart or pseudo code to show your solution.

Problem 1

Problem 2

Problem 3

Problem 4

Problem 5

Problem 6

Problem 7

**Experimental Results**

Problem 1:

**#include <stdio.h>**

**/\*\***

**\***

**\* This program read 10 integer and count number of positive and negative values among 10 inputs**

**\***

**\*/**

**int main()**

**{**

**// Set x is a array with 10 elements, number of positive and negative number is set to 0 by default**

**int x[10], number\_positive = 0, number\_negative = 0, number\_zero = 0;**

**for (int i = 0; i < 10; i++)**

**{**

**printf("Enter number %d: ", i + 1);**

**scanf("%d", &x[i]);**

**}**

**for (int i = 0; i < sizeof(x) / sizeof(x[0]); i++)**

**{**

**if (x[i] > 0)**

**number\_positive += 1;**

**else if (x[i] == 0)**

**number\_zero += 1;**

**else**

**number\_negative += 1;**

**}**

**printf("Number of positive: %d\n", number\_positive);**

**printf("Number of negative: %d\n", number\_negative);**

**if (number\_zero != 0) printf("Number of zeros is: %d, Zero is not a positive or negative number", number\_zero);**

**return 0;**

**}**

**Result**

*Figure 1. Result of the program in Problem 1 – Count number of positive and negative number among 10 inputs*

Problem 2

**#include <stdio.h>**

**/\*\***

**\***

**\* This program classify each grade into classification, and also loop to ask user to continue or not**

**\***

**\* !IMPORTANT NOTE: Add white-space befor the format specifier '%c' because input buffer may contain white-space or a newline character which may break the program in while-loop**

**\*/**

**int main()**

**{**

**char x, y;**

**while (1)**

**{**

**printf("Enter a grade: ");**

**scanf(" %c", &x);**

**switch (x)**

**{**

**case 'A':**

**printf("Excellent!\n");**

**break;**

**case 'B':**

**printf("Good!\n");**

**break;**

**case 'C':**

**printf("Fair!\n");**

**break;**

**case 'D':**

**printf("Average!\n");**

**break;**

**case 'F':**

**printf("Weak!\n");**

**break;**

**default:**

**printf("Invalid\n");**

**break;**

**}**

**printf("Do you want to continue? ");**

**scanf(" %c", &y);**

**if (y == 'y')**

**continue;**

**else**

**{**

**printf("Exit program...");**

**break;**

**}**

**}**

**return 0;**

**}**

**Result**

*Figure 2. Result of the program in Problem 1 – Grade classification*

Problem 3

**#include <stdio.h>**

**#include <math.h>**

**/\*\***

**\***

**\* This program calculate the sum of series**

**\***

**\*/**

**int main()**

**{**

**int x, y = 1, term, sum = 0;**

**printf("Input the value of x: ");**

**scanf("%d", &x);**

**printf("Input number of terms: ");**

**scanf("%d", &term);**

**for (int i = 1; i <= term; i++)**

**{**

**sum += -pow(-1, i) \* pow(x, y);**

**y += 2;**

**}**

**printf("The sum of series: %d", sum);**

**return 0;**

**}**

**Result**

*Figure 3. Result of the program in Problem 1 – Calculate sum of series*

Problem 4

**#include <stdio.h>**

**/\*\***

**\***

**\* This program calculate the factorial of a positive number**

**\***

**\*/**

**int main()**

**{**

**int num, factorial = 1;**

**printf("Enter a positive number: ");**

**scanf("%d", &num);**

**if (num < 0)**

**{**

**printf("Input number must be a positive number!");**

**return 0;**

**}**

**for (int i = 1; i <= num; i++)**

**{**

**factorial \*= i;**

**}**

**printf("Factorial: %d", factorial);**

**return 0;**

**}**

**Result**

*Figure 4. Result of the program in Problem 1 – Calculate the factorial of a positive number*

Problem 5

**#include <stdio.h>**

**/\*\***

**\***

**\* This program convert a Binary number to Decimal number using iterations**

**\***

**\*/**

**int main()**

**{**

**int x, base = 1, decimal = 0;**

**printf("Enter binary value: ");**

**scanf("%d", &x);**

**while (x != 0)**

**{**

**int reminder = x % 10;**

**x /= 10;**

**decimal += reminder \* base;**

**base \*= 2;**

**}**

**printf("Decimal: %d", decimal);**

**return 0;**

**}**

**Result**

*Figure 5. Result of the program in Problem 1 – Convert a Binary number to Decimal number using iterations*

Problem 6

**#include <stdio.h>**

**#include <stdlib.h>**

**#include <time.h>**

**/\*\***

**\***

**\* This program generate a "mystery" number random from 1 to 100, the user will guess this nnumber by prompt a value**

**\***

**\*/**

**int main()**

**{**

**int x, y;**

**char z;**

**start:**

**srand(time(0));**

**y = rand() % 100 + 1;**

**printf("I have a number between 1 and 100.\n");**

**printf("Can you guess my number?\n");**

**printf("Please type your first guess...\n");**

**scanf("%d", &x);**

**while (1)**

**{**

**if (x == y)**

**{**

**printf("Excellent! You guessed the number!\n");**

**printf("Would you like to continue (y or n)?\n");**

**scanf(" %c", &z);**

**if (z == 'y')**

**goto start;**

**else**

**goto end;**

**}**

**else if (x > y)**

**{**

**printf("Too high. Try again...\n");**

**scanf("%d", &x);**

**}**

**else**

**{**

**printf("Too low. Try again...\n");**

**scanf("%d", &x);**

**}**

**};**

**end:**

**printf("Game ends here...\n");**

**return 0;**

**}**

**Result**

*Figure 6. Result of the program in Problem 1 – Random from 1 to 100, the user will guess number*

Problem 7

**#include <stdio.h>**

**#include <math.h>**

**int factorial(int x)**

**{**

**int r = 1;**

**for (int i = 1; i <= x; i++)**

**{**

**r \*= i;**

**}**

**return r;**

**}**

**/\*\***

**\***

**\* This program calculate the sin(𝑥) which is described in the series in the question file**

**\***

**\*/**

**int main()**

**{**

**float x, sin;**

**int n, y = 1;**

**printf("Enter the value of x: ");**

**scanf("%f", &x);**

**printf("Enter the value of n: ");**

**scanf("%d", &n);**

**for (int i = 1; i <= n; i++)**

**{**

**sin += -pow(-1, i) \* (pow(x, y) / factorial(y));**

**y += 2;**

**}**

**printf("The value of sin(%0.2f) = %0.4f", x, sin);**

**return 0;**

**}**

**Result**

*Figure 7. Result of the program in Problem 1 – Calculate sin(x)*

**Conclusion**

In this lab

THE END