

Lab 2

You are expected to copy and paste your code into each corresponding box in this handout and submit it as a Word document or PDF file before the due. Additionally, your lab instructor will tell you which three questions you must showcase during the lab session. While you may demonstrate your code running in person after the due date, your file must be submitted on time.

Task 1: Write a program that reads an integer from the user and prints 'hi' that many times. For example, if the user inputs 4, the program should print 'hi' 4 times. Use a single while loop to achieve this.

```
#include <stdio.h>

int main() {
    int times, counter = 0;
    printf("Enter a positive integer:\n");
    scanf("%d", &times);
    while (counter < times) {
        printf("hi\n");
        ++counter;
    }

    return 0;
}
```

Task 2: Write a program that reads an integer from the user and prints all positive even numbers up to the user's input. For example, if the user enters 6, the program should print 2, 4, and 6. Use a single **for** loop to accomplish this.

```
#include <stdio.h>

int main() {
    int max_number = 0;
    printf("Enter a positive integer:\n");
    scanf("%d", &max_number);
    for (size_t count = 1; count <= max_number; ++count) {
        if (max_number < 0) {
            break;
        }

        if (!(count % 2)) {
            printf("%zu\n", count);
        }
    }

    return 0;
}
```

Task 3: Write a program that reads an integer from the user and prints all numbers between 1 and the input value (exclusive). For example, if the input is 3, the program should print 1 and 2. Use a single **for** loop to achieve this.

```
#include <stdio.h>

int main() {
    int max_number = 0;
    printf("Enter a positive integer:\n");
    scanf("%d", &max_number);
    for (size_t count = 1; count < max_number; ++count) {
        if (max_number < 0) {
            break;
        }

        printf("%zu\n", count);
    }

    return 0;
}
```

Task 4: Write a program that keeps reading integers from the user and prints double the value of each input, stopping when the user enters a non-positive integer. For example, if the user inputs 5, print 10; the program should stop if the input is 0 or a negative integer. Use one **do-while** loop to implement this.

```
#include <stdio.h>

int main() {
    int success;
    int user_input = success = 0;
    do {
        printf("Enter an integer:\n");
        success = scanf("%d", &user_input);

        if (user_input > 0 && success) {
            printf("%d\n", 2 * user_input);
        }

    } while (user_input > 0 && success);

    return 0;
}
```

Task 5: Write a program that continuously reads integers from the user and prints the running sum, stopping only when the sum exceeds 100. For example, if the user inputs 5, print 5; if the next input is 10, print 15. The program should stop once the sum is greater than 100. Use a **do-while** loop to implement this.

```
#include <stdio.h>

int main() {
    int success, sum_so_far;
    int user_input = success = sum_so_far = 0;
    do {
        printf("Enter an integer:\n");
        success = scanf("%d", &user_input);

        if (success) {
            printf("%d\n", sum_so_far += user_input);
        }

    } while (sum_so_far <= 100 && success);

    return 0;
}
```

Task 6: Write a program that prints numbers between 1 and 70 that are multiples of 3 or 5, but not multiples of 15. You may choose any loop statement, but the program must use **only one** if-statement.

```
#include <stdio.h>

int main() {
    for (size_t i = 1; i <= 70; ++i) {
        // if not multiple of 15 and (multiple of 5 or
        // multiple of 3) (de morgan)
        if ((i % 15) && !((i % 5) && (i % 3))) {
            printf("%lu\n", i);
        }
    }

    return 0;
}
```

Task 7: Write a program that reads a character from the user and prints its uppercase form if the character is a vowel. Otherwise, print 'X'. Use one **switch** statement to implement this.

```
#include <stdio.h>

int main() {
    printf("Enter a character:\n");
    char user_input = getchar();

    switch (user_input) {
        case 'a':
        case 'e':
        case 'i':
        case 'o':
        case 'u':
            // 0x20 apart (see unicode table)
            printf("%c", user_input - 0x20);
            break;
        case 'A':
        case 'E':
        case 'I':
        case 'O':
        case 'U':
            printf("%c", user_input);
            break;
        default:
            printf("X");
    }
    printf("\n");
    return 0;
}
```

Task 8: Write a program that reads an integer and prints 'even number', 'positive odd number', or 'negative odd number' based on the input. Use one **switch** statement to implement this.

```
#include <stdio.h>

int main() {
    int user_input;
    printf("Enter an integer:\n");
    scanf("%d", &user_input);

    switch (user_input % 2) {
    case 1:
        printf("positive odd number\n");
        break;
    case -1:
        printf("negative odd number\n");
        break;
    default:
        printf("even number\n");
    }

    return 0;
}
```


Task 9: Write a program that reads an integer from the user and prints all positive even numbers less than the input value. Use a **continue** statement to skip even numbers that are multiples of 6.

```
#include <stdio.h>

int main() {
    int user_input;
    printf("Enter an integer:\n");
    scanf("%d", &user_input);

    for (int i = 1; i < user_input; i++) {
        if (!(i % 6)) {
            continue;
        } else if (!(i % 2)) {
            printf("%d\n", i);
        }
    }

    return 0;
}
```

Task 10: Write a program that reads an integer from the user and prints all positive even numbers smaller than the input value. Use a **break** statement to stop printing when an even number exceeds 15.

```
#include <stdio.h>

int main() {
    int user_input;
    printf("Enter an integer:\n");
    scanf("%d", &user_input);

    for (int i = 1; i < user_input; i++) {
        if (i > 15) {
            break;
        } else if (!(i % 2)) {
            printf("%d\n", i);
        }
    }

    return 0;
}
```