Lab Assignment 3

Fall 2024

Course Title: Structured Programming Lab

Course Code: CSE 1202 (Fall 2024)

Submitted by:

Student Name and ID

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1. Write a program to find the largest and smallest among three entered numbers and also display whether the identified largest/smallest number is even or odd.

Answer :

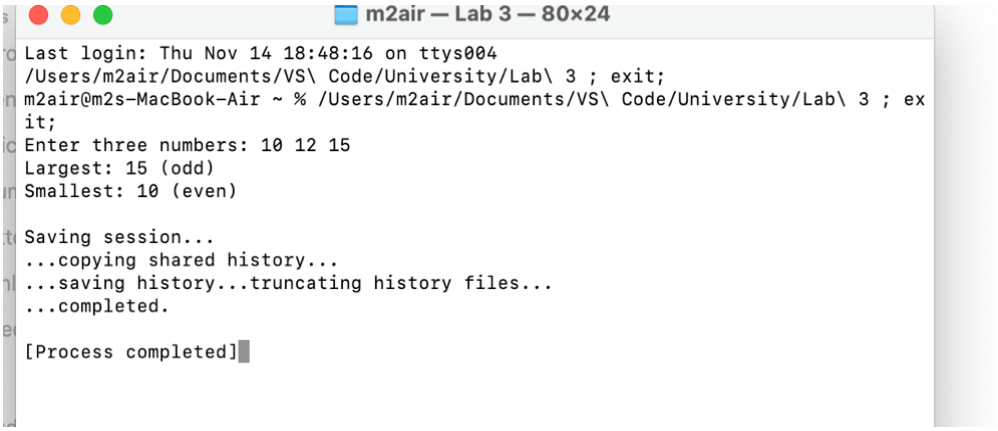
Algorithm:

1. Take three numbers as input.
2. Determine the largest and smallest numbers among the three.
3. Check if the largest and smallest numbers are even or odd.
4. Display the results.

Code

```
#include <stdio.h>

int main() {
    int num1, num2, num3;
    int largest, smallest;

        printf("Enter three numbers: ");
    scanf("%d %d %d", &num1, &num2, &num3);

        largest = (num1 > num2) ? ((num1 > num3) ? num1 : num3) : ((num2 > num3) ? num2 : num3);

        smallest = (num1 < num2) ? ((num1 < num3) ? num1 : num3) : ((num2 < num3) ? num2 : num3);

        printf("Largest: %d (%s)\n", largest, (largest % 2 == 0) ? "even" : "odd");
    printf("Smallest: %d (%s)\n", smallest, (smallest % 2 == 0) ? "even" : "odd");

    return 0;
}
```

Output Result :



2. Write a program that asks a number and test the number whether it is multiple of 5, divisible by 7 but not by eleven.

Answer :

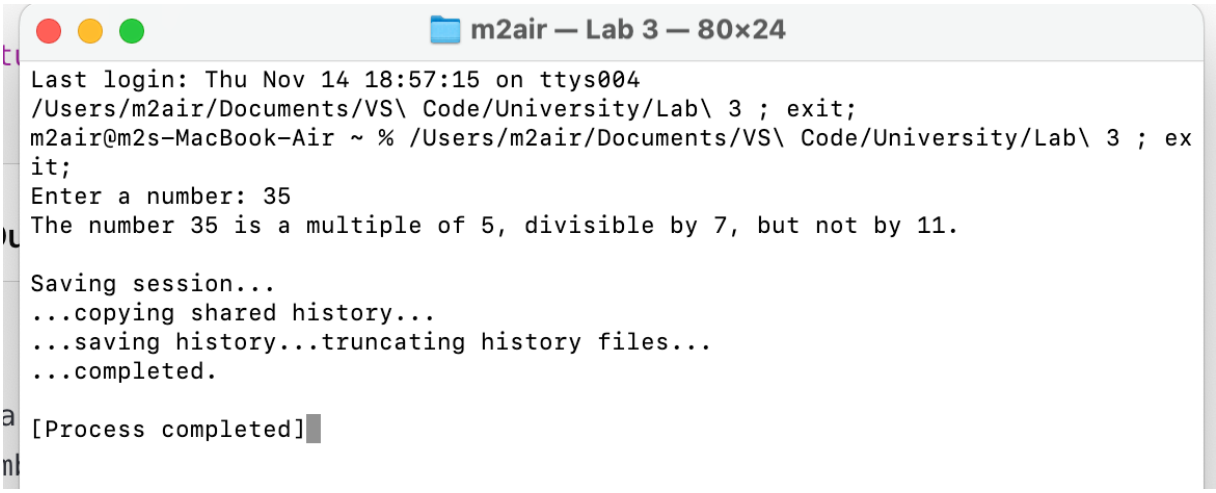
Algorithm:

1. Take a number as input.
2. Check if the number is a multiple of 5, divisible by 7, and not divisible by Eleven.
3. Display the result accordingly.

Code

```
#include <stdio.h>

int main() {
    int num;
    printf("Enter a number: ");
    scanf("%d", &num);

        if (num % 5 == 0 && num % 7 == 0 && num % 11 != 0) {
        printf("The number %d is a multiple of 5, divisible by 7, but not by 11.\n", num);
    } else {
        printf("The number %d does not meet the criteria.\n", num);
    }

    return 0;
}
```

Output Result :



3. Write a program to check whether the entered year is leap year or not (a year is leap if it is divisible by 4 and divisible by 100 or 400.)

Answer :

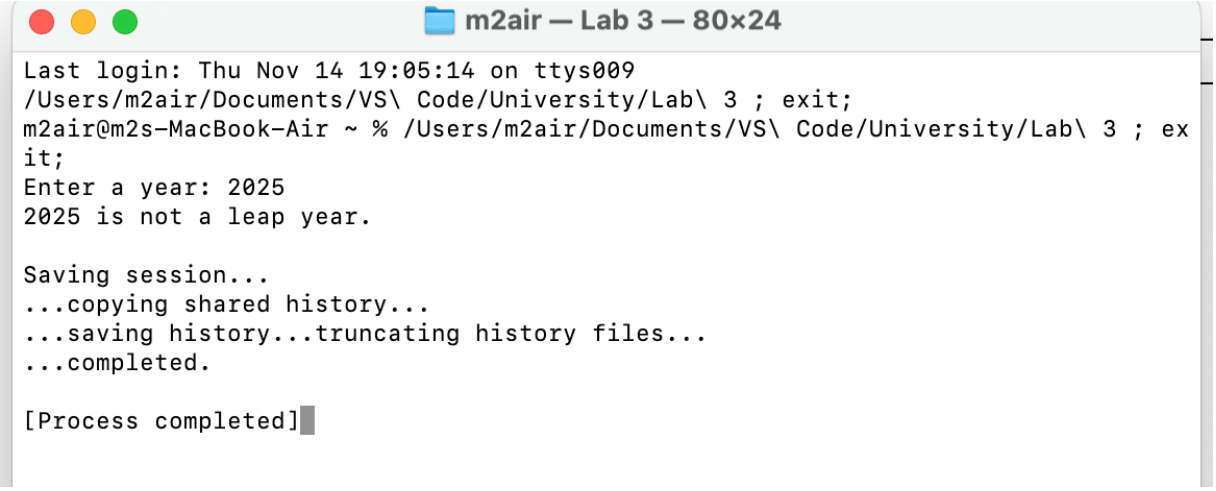
Algorithm:

1. Take a year as input.
2. Check if the year is divisible by 4, If it is, also check if it's divisible by 100. If it is, check if it's divisible by 400 to determine if it's a leap year.
3. Display the result.

Code

```
#include <stdio.h>

int main() {
    int year;

    printf("Enter a year: ");
    scanf("%d", &year);

    if ((year % 4 == 0 && year % 100 != 0) || (year % 400 == 0)) {
        printf("%d is a leap year.\n", year);
    } else {
        printf("%d is not a leap year.\n", year);
    }

    return 0;
}
```

Output Result :



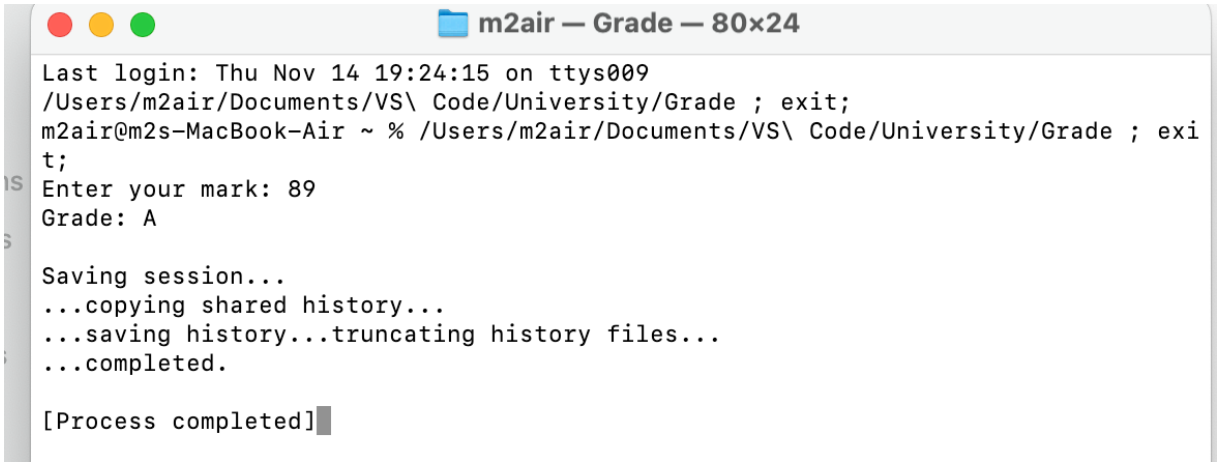
4. Find the letter grade of a given mark. Follow the grading system of ULAB.
Answer :
Algorithm:

1. Take the student's mark as input.
2. Use if-else conditions to determine the letter grade based on the provided grading ranges.
3. Display the letter grade.

Code

```
#include <stdio.h>

int main() {
    int mark;

    printf("Enter your mark: ");
    scanf("%d", &mark);

    if (mark >= 95) {
        printf("Grade: A+\n");
    } else if (mark >= 85) {
        printf("Grade: A\n");
    } else if (mark >= 80) {
        printf("Grade: A-\n");
    } else if (mark >= 75) {
        printf("Grade: B+\n");
    } else if (mark >= 70) {
        printf("Grade: B\n");
    } else if (mark >= 65) {
        printf("Grade: B-\n");
    } else if (mark >= 60) {
        printf("Grade: C+\n");
    } else if (mark >= 55) {
        printf("Grade: C\n");
    } else if (mark >= 50) {
        printf("Grade: D\n");
    } else {
        printf("Grade: F\n");
    }

    return 0;
}
```

Output Result :



5. Write a program to input a letter and display it in opposite case, i.e., if the given letter is in upper case, display it in lower case and vice-versa

Answer :

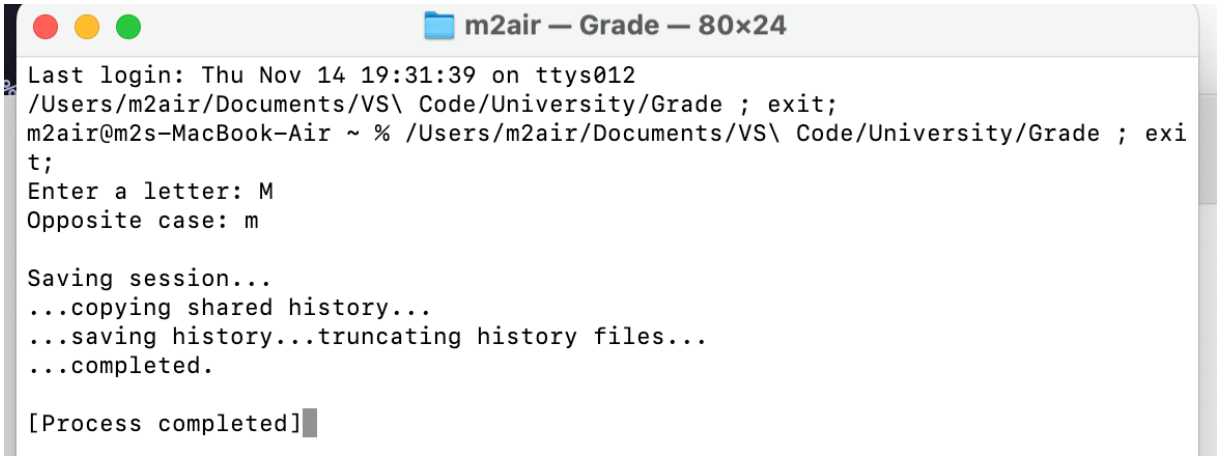
Algorithm:

1. Input a character from the user.
2. If uppercase, convert to lowercase; if lowercase, convert to uppercase; otherwise, display "Invalid input."
3. Output the result.

Code

```
#include <stdio.h>

int main() {
    char letter;
    printf("Enter a letter: ");
    scanf(" %c", &letter);

    if (letter >= 'A' && letter <= 'Z') {
        printf("Opposite case: %c\n", letter + 32);
    } else if (letter >= 'a' && letter <= 'z') {
        printf("Opposite case: %c\n", letter - 32);
    }
else {
        printf("Invalid input.\n");
    }
    return 0;
}
```

Output Result :



6. Write a program that will give a choice menu. Using if for coding
Take two inputs and one operator and do the calculation.
Press '+': Add two numbers
Press '-': Subtract two numbers
Press '*': Multiply two numbers
Press '/': Division two numbers
Input: 8 / 10
Output: 0.80
Answer :
Algorithm:

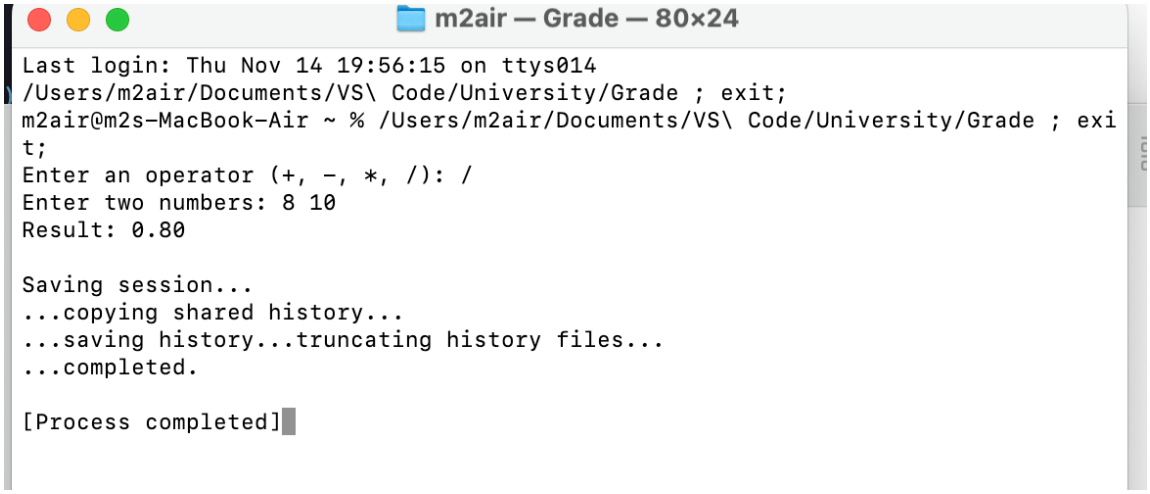
1. Display a menu with options.
2. Take two numbers and an operator as input.
3. Perform the operation based on the operator chosen.
4. Display the result.

Code

#include <stdio.h>
 	
int main() {
  float num1, num2, result;
  char operator;
 	
  printf("Enter an operator (+, -, *, /): ");
  scanf(" %c", &operator);
 	
  printf("Enter two numbers: ");
  scanf("%f %f", &num1, &num2);

```
    if (operator == '+') {
        result = num1 + num2;
    } else if (operator == '-') {
        result = num1 - num2;
    } else if (operator == '*') {
        result = num1 * num2;
    } else if (operator == '/') {
        if (num2 != 0) {
            result = num1 / num2;
        } else {
            printf("Error: Division by zero\n");
            return 1;
        }
    } else {
        printf("Invalid operator\n");
        return 1;
    }

    printf("Result: %.2f\n", result);
    return 0;
}
```

Output Result:



7. Write a program that will give a choice menu. Using switch for coding
Take two inputs and one operator and do the calculation.
Press '+': Add two number
Press '-': Subtract two number
Press '*': Multiply two number
Press '/': Division two number
Input: 8 / 10
Output: 0.80
Answer :

Algorithm:

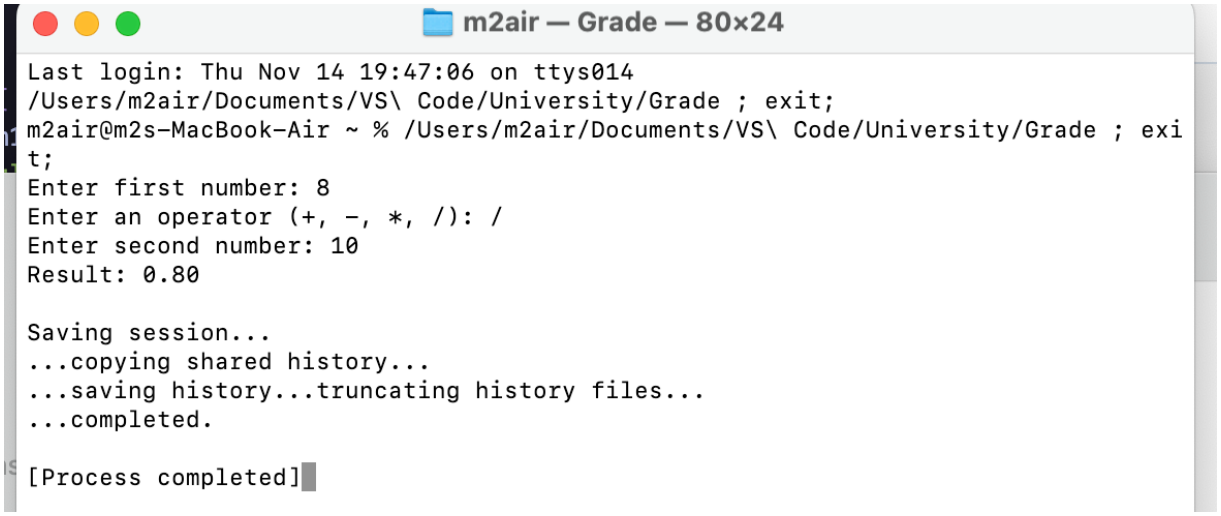
1. Present a choice menu with options to add, subtract, multiply, or divide two numbers.
2. Use a switch statement to perform the selected operation.
3. Take two numbers and an operator as input and display the result.

Code

```
#include <stdio.h>

int main() {
    double num1, num2, result;
    char operator;

    printf("Enter first number: ");
    scanf("%lf", &num1);
    printf("Enter an operator (+, -, *, /): ");
    scanf(" %c", &operator);
    printf("Enter second number: ");
    scanf("%lf", &num2);

    switch (operator) {
        case '+':
            result = num1 + num2;
            printf("Result: %.2lf\n", result);
            break;
        case '-':
            result = num1 - num2;
            printf("Result: %.2lf\n", result);
            break;
        case '*':
            result = num1 * num2;
            printf("Result: %.2lf\n", result);
            break;
        case '/':
            if (num2 != 0) {
                result = num1 / num2;
                printf("Result: %.2lf\n", result);
```

```
        } else {
            printf("Error: Division by zero is not allowed.\n");
        }
        break;
    default:
        printf("Error: Invalid operator.\n");
}

return 0;
}
```

Output Result :



Discussion :

In this assignment, we practiced using basic control structures in C, such as conditional statements (`if-else`, `switch`), logical operators, and character handling. Key tasks included finding the largest and smallest numbers, checking divisibility, determining leap years, grading based on marks, case conversion, and building a basic calculator. This hands-on experience improved our skills in writing efficient code, implementing error handling, and using algorithms effectively. It provided a solid foundation for solving real-world problems using structured programming..