

ME 101 Assignment 3 Winter 2022

Questions 1 to 3 of the assignment are to be completed in pairs, while question 4 (Learn Quiz) is to be completed individually.

Experience with programming before starting ME 101 varies.

If you have one partner who is noticeably more experienced than the other, try having the inexperienced person at the keyboard typing the code with the more experienced person offering suggestions that help teach the person with less experience. Teaching another person is a great way to get better at something!

If both partners have similar experience, try alternating who is typing the code, the driver, and who is offering suggestions, the navigator. (If you are curious, look up pair programming to find a description of this technique as it is used for agile programming.)

Deliverables

Questions 1 to 3 of this assignment will be completed in partnership while question 4 individually.

In this assignment you will:

- Create flowcharts
- Use `if` statements
- Determine appropriate test cases
- Input files

There are four deliverables for this assignment:

- Question 1
- Question 2
- Question 3
- Question 4 – Week 3 Learn quiz

Crowdmark submission with partnership

Prior to submitting your project work to Crowdmark, you need to form a group according to the instructions (shown below) when you are at the Assignment 3 submission area in Crowdmark.

Click the **Add group members** button at Crowdmark and choose your group for this assignment or wait for someone else to add you to their group. **You will not be able to change your group members after the assignment has been submitted.**

Each group member you add will receive an email notification and shared access to this page. Any group member may submit the assignment or edit group members.

Question 1 - Making decisions for Game Night

At Ryan's house, every night is board game night. However, there have been arguments as to what to play, so he has made a schedule.

Day of Week	School Night	Start at 6pm	Start at 9pm
Weekday	Yes	Spirit Island	Code Names
Weekday	No	Spirit Island	Settlers of Catan
Friday or Saturday		Ticket to Ride	Ticket to Ride
Sunday	Yes	Flash Point	Code Names
Sunday	No	Flash Point	Settlers of Catan

For example, if it is a Weekday night (Mondays to Thursdays) that is a school night starting at 9:00pm, Ryan will play Code Names. Friday and Saturday nights are never school nights.

Write a program:

You will write a program that prompts for the day of the week (Weekday, Friday, Saturday, or Sunday), whether it is a school night (1) or not (0), and the start time (6 or 9), and outputs the game to play. When writing the program, use logical operators and/or nesting to reduce the number of if-else statements.

Sample output is:

```
Enter day, whether it is a school night, and time: Weekday 1 9
Play Code Names
```

Flow Chart:

Draw a legible, well labelled flow chart using proper flow chart symbols (as given in the ME 101 lecture video and shown in lecture examples), which shows the program steps, including the decisions that need to be made. Try to structure the code so that there is only one branch to reach a given outcome. When you are drawing it, think about the test cases that are needed to ensure that every branch is executed.

The flow chart can be drawn using a drawing tool on your computer or it can be hand drawn on a separate piece of paper and then scanned or photographed to generate a .pdf or .png or .jpg file.

What You Need to Submit into Crowdmark

- Submit your flow chart (make sure the flow chart is legible)
- Submit your code with the output from sufficient test cases pasted at the bottom as a /*block comment*/

Question 2

The file `intNumber.txt` contains 10 integer numbers (in the thousands).

Complete the program below so that it:

- Opens the file and check that it opens correctly; closes the file when done
- Reads each number from the file
- Outputs it to the screen (console) using commas (don't convert the number to a string to do this)

```
#include <cstdlib>
#include <iostream>
#include <cmath>
using namespace std;

int main()
{
    const int NUM_VALUE = 10;

    // open file, and check for open correctly

    for (int count = 1; count <= NUM_VALUE; count++)
    {
        // read value from file

        // output using a comma
    }

    // close file

    //system("PAUSE");
    return EXIT_SUCCESS;
}
```

Examples of the program output are given as:

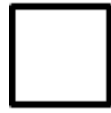
425,081
-11,004

What You Need to Submit into Crowdmark

- Submit your code with the output for the above cases pasted at the bottom as a `/*block comment*/`

Question 3 – Classifying Paving Stones

There are three possible shapes for paving stones.



Square



Rectangle



Parallelogram

Write a program that:

- Prompts for the length of 2 adjacent sides (in cm) and the contained angle ($0^\circ < \text{angle} < 180^\circ$), and outputs an error message when the input data are out of range. You may assume that the user enters numbers.
- Outputs which paving stone shape corresponds to the data. Use a tolerance of 1mm for side lengths, and 0.5 degrees for angles.

When coding your conditions, avoid repeating comparisons. Marks will be lost for unnecessary repetitions.

Sample output, that does not cover all test cases, is:

```
Enter two adjacent sides and a contained angle 8.1 6.5 180
Invalid data out of range
Enter two adjacent sides and a contained angle 2.5 2.401 89.501
The paving stone is a square
Enter two adjacent sides and a contained angle 2.5 2.5 90.501
The paving stone is a parallelogram
```

What to Submit in Crowdmark

- Your code, and include adequate test cases to demonstrate that all features of the program are working properly in /*Block comments*/ at the end

(Completed Individually) Question 4: Week 3 assignment quiz

Login to Learn and complete the week 3 assignment quiz. You can attempt the quiz an unlimited number of times and the highest grade is used.