ME 101 Assignment 2 Winter 2022

Deliverables

Questions 1, 2, and 3 of this assignment will be completed in pairs – split up your project group of 4 people into pairs of 2 people each. Question 4 is to be completed individually.

In this assignment you will:

- Use the math operators and math functions from cmath
- Determine suitable test cases

There are four deliverables for this assignment:

- Question 1
- Question 2
- Question 3
- Question 4 – Assignment 2 quiz (available on UW Learn)

Crowdmark submission with partners

Prior to submitting your assignment work to Crowdmark, you need to form a group according to the instructions (shown below) when you are at the Assignment 2 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

Write a program that:

- Prompts for an amount, which has already been rounded to the nearest 5 cents
- Outputs the minimum number of each type of coin needed for that amount

You do not need to verify that the amount is correctly rounded.

Sample output is:

```
Enter an amount in cents (rounded to nearest 5) 1065
Toonies 5
Loonies 0
Quarters 2
Dimes 1
Nickels 1
```

What You Need to Submit into Crowdmark

- Run the program for 995 and 2065 cents
- Submit your code with the output from the given test cases pasted at the bottom as a `/*block comment*/`

Question 2

Problem Description

The final value of an investment that earns interest compounded monthly over several years is calculated as:

$$final\_value = principle \times \left(1 + \frac{interest\_rate}{12}\right)^{12 \times years}$$

Write a program that:

- Prompts for the initial (principle) value, the interest rate, and the number of years the investment will be held
- Outputs to the screen the final value of the investment

Notes:

Now that you have learned about named constants, you should start using them in your programs, e.g. declaring a constant rather than using the literal 12.

In what format is your program expecting the percentage for the interest rate to be entered? Is 1.25% to be entered as `1.25` or as `0.0125`? State your assumption as a comment.

What You Need to Submit into Crowdmark

- Run the code for an investment of $3025 that has an interest rate of 1.25% and is held for 4 years
- Submit your code with the output from the given test case pasted at the bottom as a `/*block comment*/`

Question 3

Write a program that:

- Prompts for the length of two sides of a triangle, a_side and b_side, and the contained angle, c_angle (in degrees) of a triangle
- Calculates the remaining side and angles, the perimeter of the triangle, and the area of the triangle
- Outputs all side lengths and angles (in both degrees and radians), the perimeter, and the area

Test Cases

Think of at least three test cases that represent different types of valid triangles. Use a calculator to complete the above chart for the three triangles, then use those test cases to test and debug your program.

Input			Calculated values					
a_side	b_side	c_angle	c_side	a_angle	b_angle	a_angle	perimeter	area

What You Need to Submit into Crowdmark

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

Useful formulae:

Cosine Law

$$c\_side = \sqrt{a\_side^2 + b\_side^2 - 2 \times a\_side \times b\_side \times \cos(c\_angle)}$$

Perimeter of a triangle

$$perimeter = a\_side + b\_side + c\_side$$

Area of a triangle

$$semi\_per = perimeter/2$$

$$area = \sqrt{semi\_per(semi\_per - a\_side)(semi\_per - b\_side)(semi\_per - c\_side)}$$

Question 4: Assignment 2 Quiz (Individually)

Login to Learn and complete the Assignment 2 Quiz. You can attempt the quiz an unlimited number of times and the highest grade is used.