

Homework 1

Introduction to Assembly

The following problem set is worth 100 points. Please submit a zip file containing all source code I need to run your assignments using **QtSPIM**. Code will be graded on elegance and correctness.

Problem 1: BMI Problem (20pts)

Body Mass Index (BMI) helps in specifying the weight category a person belongs to, depending on their body weight. BMI is estimated using the following formula:

$$BMI = \frac{(weight\ in\ kilograms)}{(height\ in\ meters)^2}$$

Write a program that calculates and outputs the BMI. Assume various input values wherever required.

Save your solution in the file named **bmi.asm**.

Problem 2: Time Problem (20pts)

Write a MIPS program that asks the user to enter the number of seconds in a period. Your program should output the number of hours, minutes and seconds that correspond to the value the user entered. As an example, if the user input is 50,391 total seconds. The output should be 13 hours, 59 minutes, and 51 seconds.

Save your solution in a file named **time.asm**.

Problem 3: Caffeine Problem (20pts)

Scientists estimate that roughly 10 grams of caffeine consumed at one time is a lethal overdose. Write a program with a variable that holds the number of milligrams of caffeine in a drink and outputs how many drinks it takes to kill a person. A 12-ounce can of cola has approximately 34 mg of caffeine, while a 16-ounce cup of coffee has approximately 160 mg of caffeine. (As a hint, you will need to collect the cup size and the number of mg of caffeine per drink).

Save your solution in a file named **caffeine.asm**.

Problem 4: Loan Problem (20pts)

Calculating interest paid on a loan can be done using the following formula:

$$Simple\ interest = \frac{(Principal\ amount * Interest\ rate * Number\ of\ years)}{100}$$

Write a MIPS program that collects the three variables above from the user and displays the simple interest amount. Some example values would be a \$1000 loan principal, 5% interest rate over a 5-year period.

Save your solution in a file named **loan.asm**.

Problem 5: Square Root (20pts)

Given a non-negative integer x , return the square root of x rounded down to the nearest integer. The returned integer should be non-negative as well.

Example 1:

Input: $x = 4$

Output: 2

Explanation: The square root of 4 is 2, so we return 2.

Example 2:

Input: $x = 8$

Output: 2

Explanation: The square root of 8 is 2.82842..., and since we round it down to the nearest integer, 2 is returned.

Save your solution in a file named **sqrt.asm**.

Submission Requirements

Please submit a zip file containing all source code I need for testing before the closing of the Canvas drop box.