

ECE 71 – Computational Programming for Engineers

Professor Kriehn – Fall 2017

Code Due By: Midnight on Thursday, September 07, 2017

Writeup Due By: Class Time on September 11 or 12, 2017

HOMEWORK #3 – Basal Metabolic Rate Determination

The Harris-Benedict equation estimates the number of calories your body needs to maintain your weight if you do no exercise. This is called your basal metabolic rate, or BMR.

The formula for the calories need for a woman to maintain her weight is

$$\text{BMR} = 655 + (4.3 \times \text{weight in pounds}) + (4.7 \times \text{height in inches}) - (4.7 \times \text{age in years})$$

The formula for the calories needed for a man to maintain his weight is

$$\text{BMR} = 66 + (6.3 \times \text{weight in pounds}) + (12.9 \times \text{height in inches}) - (6.8 \times \text{age in years})$$

A typical chocolate bar will contain around 230 calories. Write a program that allows the user to input his or her weight in pounds, height in feet and inches, age in years, and the character 'M' for male and 'F' for female. The program should then output the number of chocolate bars that should be consumed to maintain one's weight for the appropriate sex of the specified weight, height, and age.

Specifications:

Use Netbeans to create a HW03 project, and a main.cpp file using C++11. Use a constant BAR to define the number of calories in a chocolate bar, and a constant IPF to define the number inches per foot.

Prompt the user to enter the weight in pounds, height in feet and inches, age in years, and sex. Convert the height to inches, and use the appropriate equation to calculate the BMR (use an if-else statement). Then calculate the number of chocolate bars needed to maintain his or her weight.

Print the BMR, the number of calories per chocolate bar, and number of chocolate bars to the screen.

Be sure to use a semicolon ';' each time the user is prompted for information.

As an example, if you execute the program with the following underlined inputs, the output will be:

```
Enter your weight in lbs: 195
Enter your height in feet and inches: 5 11
Enter your age: 42
Enter your sex (M/F): M
```

```
Your BMR is 1924.80 calories.
If a chocolate bar contains 230 calories,
you need to eat 8.37 chocolate bars to maintain your weight.
```

After you develop your I/O diagram, pseudocode, and debug your code, submit to the Grader Program.

HOMEWORK #4 – Interest Payment Plan

You have just purchased a stereo system that costs \$1000.00 on the following credit plan: no down payment, an interest rate of 18% per year (and hence 1.5% per month), and monthly payments of \$50.00. A portion of the monthly payment of \$50.00 is first used to pay the interest, and whatever is left is used to pay part of the remaining debt.

After the first month, you pay 1.5% of \$1,000 in interest, which is \$15.00. So the remaining \$35.00 is deducted from your debt, which leaves you with a debt of \$965.00. The next month you pay interest of 1.5% of \$965.00, which is \$14.48. Therefore, you can deduct \$35.52 ($\$50.00 - \$14.48 = \35.52) from your current debt.

Write a program that will tell you how many months it will take you to pay off the loan, as well as the total amount of interest paid over the life of the loan. After each month, also print the interest payment, loan payment, and remaining balance on the loan.

Specifications:

Use Netbeans to create a HW04 project, and a main.cpp file using C++11. Use a loop to calculate the amount of interest, loan payment, and the size of the debt after each month. Print the results to the screen in dollar format (2 values after the decimal point), and use the `setw()` function to set the width of the numbers being printed so that the dollar and cents align correctly between the numbers. You may also want to use the tab character. Include constants for the monthly interest rate, the monthly payment, and any additional variables you need to solve the problem.

The output of your program should look like:

```
Month 1
Interest Payment:      $ 15.00
Loan Payment:         $ 35.00
Remaining Loan:       $965.00
```

```
Month 2
Interest Payment:      $ 14.47
Loan Payment:         $ 35.52
Remaining Loan:       $929.48
```

...

```
The loan will take 24 months to pay off.
The total interest payments are $197.83.
```

After you develop your I/O diagram, pseudocode, and debug your code, submit to the Grader Program.