

CS210 – Machine Problem 3

Survivor Logistics Planning
20 Points

Assigned: January 24, 25 2017

Due: January 31, Feb. 2 2017

Paramount to long-term zombie survival is adequate food. Maintaining an appropriate level of supplies for your group is important both for keeping morale high and providing energy for the frequent bursts of activity that occur during an apocalypse.

To maintain one's body weight, an adult human needs to consume enough calories daily to:

1. Meet the basal metabolic rate (energy required to breathe, maintain body temperature, etc.),
2. Account for physical activity such as exercise,
3. Account for the energy required to digest the food that is being eaten.

For an adult that weighs P pounds, we can estimate these caloric requirements using the following formulae:

1. Basal metabolic rate: $Calories = (P/2.2) \times 24.2$
2. Physical Activity: $Calories = 0.0385 \times Intensity \times P \times Minutes$. Here, $Minutes$ is the number of minutes spent during the physical activity, and $Intensity$ is a number that estimates the intensity of the activity. Here are some sample number for the range of values:

Activity	Intensity
Hiding in Shopping Mall	1
Changing RV Radiator Hose	3
Shooting Zombies	8
Running from Slow Zombies	10
Running from Fast Zombies	17

3. Energy to digest food: $Calories = TotalCaloriesConsumed \times 0.1$. In other words, 10% of the calories we consume go toward digestion. Therefore, if we need $Calories$ after digestion, we use the equation $TotalCaloriesConsumed = Calories/0.9$

Write a **function** that computes the calories required for the basal metabolic rate, taking an input parameter for the person's weight. Write another **function** that computes the calories required for physical activity, taking input parameters for the intensity, weight, and minutes spent exercising.

Use these functions in a program that inputs a persons weight, an estimate for the intensity of physical activity, the number of minutes spent performing the physical activity, and the number of calories in one serving of the food at hand. The program should then calculate and output how many servings of that food should be eaten per day to maintain the person's current weight at the specified activity level. The computation should include the energy that is required to digest the food.

To get C to print a floating point number with 0 places past the decimal, use the print specifier "%.0lf".

Sample Runs

Survivor Logistics Planner

This program will help plan your foraging missions

Enter survivor's weight:180

Enter intensity of activity:8

Enter minutes of activity:60

Enter number of calories in available food:200

For the activity, the survivor will need a total of 5896 calories

To maintain their weight, they will need to consume 29 servings of the available food.

Survivor Logistics Planner

This program will help plan your foraging missions

Enter survivor's weight:280

Enter intensity of activity:17

Enter minutes of activity:120

Enter number of calories in available food:1000

For the activity, the survivor will need a total of 27857 calories

To maintain their weight, they will need to consume 28 servings of the available food.