

CS 580 Assignment 2

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Universal BMI Calculator

Questions:

1 What are limitations of BMI lookup table shown in Table 4.5?

Answer:

(1) Some people such as basketball players can be taller than 6' 4"(193 cm) or heavier than 215 lbs (97.7kgs). These people who are outliers cannot use this table.

(2) The boundaries are ambiguous. If I find my BMI is between 29 and 30. It is hard to tell whether I am overweight or not.

(3) Based on Table 3.2, the BMI categories for US/European and Asian are different. From the lookup table, we can see that this table is just for US adult population not for Asian.

2 What elements need to be considered and included in the design of universal BMI calculator?

Answer:

(1) Users can input their personal data using standard or metric measures.

(2) Designers should use input validation to see if the user entered the data correctly. For example,

1) The attributes of feet, inch, cm, pound and kg should be a numeric value other than other data types.

2) Because of common sense, the input value of inch should be an integer and the range is from 0 to 11.

3) The input value of feet should be an integer and the range is from 1 to 8.

(3) After calculating the BMI, the system should also give the user weight status and BMI categories and helpful advice.

(4) The user needs to reset the input form so that the user can input different data.

(5) The user interface should be friendly.

3 What elements will be included if the design of universal BMI calculator is extended to calculate increased risk of obesity-associated disease.

Answer:

Firstly, the system should show the user the weight status and the standard weight status categories associated with BMI ranges for adults.

A report in Centers for Disease Control and Prevention web shows that the correlation between the BMI and body fatness is fairly strong, but even if two people have the same BMI, their level of body fatness may differ.

In general,

At the same BMI, women tend to have more body fat than men.

At the same BMI, Blacks have less body fat than do Whites, and Asians have more body fat than do Whites.

At the same BMI, older people, on average, tend to have more body fat than younger adults.

At the same BMI, athletes have less body fat than do non-athletes.

So these are important elements we should consider about.

4 Implement a simple universal BMI calculator. The focus is on the understanding of the BMI calculation, not programming skills. Any form of implement is fine, for example Excel, or a command program.

Answer:

The attached txt file "BMI.txt" is my solution. The programming language is JavaScript. And I used Twitter bootstrap framework(bootstrap.css and bootstrap.js) to make the user interface friendly and colorful.

How to run:Please rename this file "BMI.html" and then open it by a web browser such as Chrome or IE Explorer or Firefox.

The screen-shot of this software:

(1) The user who is 5'4" and 150 lbs. His/her BMI is 25.74, and this user is overweight.

Click on the Tabs to enter your weight and height using standard or metric measures..

US/Europe Japan/Hongkong

Standard

Height:(feet) 5 Height:(inch) 4 Weight(lb) 150

Calculate My BMI Reset

My Body Mass Index

25.74462890625

My Weight Status

Overweight

Underweight (BMI range: 16.0-18.5)

If your BMI is under 16, that means Severely Underweight.
An advice for underweight people is to take some healthy high-energy food.

Healthy Weight (BMI range: 18.5-25.0)

(2) The user who is 187 cm and 87 kgs. His/her BMI is 24.87, and this user is also overweight.

US/Europe Japan/Hongkong

Metric

Height:(cm) 187 Weight(Kg) 87

Calculate My BMI Reset

My Body Mass Index

24.879178701135288

My Weight Status

Overweight

Underweight (BMI range: < 18.5)

An advice is to take some healthy high-energy food.

Healthy Weight (BMI range: 18.5-22.9)

Awesome! Continue to keep in good health!

Overweight (BMI range: 23.0-24.9)

A diagnostic test has been used to detect respiratory disease. A dataset has been constructed based on test results of 10,000 people. Among the 10,000, 500 have respiratory disease and 9500 do not have the disease. 350 of the 500 people with respiratory disease and 1900 of the 9500 people without respiratory disease got positive test results.

Questions:

1. Construct a contingency table based on the dataset.

Answer:

		Test Result		
		Positive(+)	Negative(-)	
respiratory disease Status	Positive(+)	350	150	500
	Negative(-)	1900	7600	9500
		2250	7750	10000

2. Calculate the sensitivity and specificity of the test.

$$SE = TP / (TP + FN) = 350 / (350 + 150) = 70\%$$

$$SP = TN / (TN + FP) = 7600 / (7600 + 1900) = 80\%$$