You will be instructed to solve a problem in two parts and submit files for each part. This demonstrates how to approach solving a large problem by solving one smaller part at a time. By solving a smaller part correctly before adding the next, one can keep the number of statements and errors that may result from them to a minimum. The addition requirements in Part b demonstrates how an existing problem may change in scope and thus the solution program must be modified. By saving the first part with an incremental file name, additional versions can easily be saved using subsequent names providing good backup files.

> *Read all instructions before beginning your work.*

Problem:

PART a:

> *NOTE: Your submitted file(s) MUST be spelled and cased as instructed.*

Before you start writing your program:

Read the Software Development Plan to plan your solution to the assignment problem.

Program: **assign02a.c**

A growing number of people are becoming more health conscious watching their diet and exercising more. Statistics are available to help them monitor their progress toward becoming a healthier person. The body mass index (BMI) is a statistical measure which compares a person's weight and height. Though it does not actually measure the percentage of body fat, it is used to estimate a healthy body weight. The following equation is used to calculate body mass index. Note: The mass is the body weight in kilograms and height is in meters. [http://en.wikipedia.org/wiki/Body_mass_index]

$$\text{BMI} = \frac{\text{mass (kg)}}{\text{height}^2 (\text{m}^2)}$$

You are to write a program that prompts the user to enter a weight in **pounds** and a height in **inches** and displays the BMI with proper labeling. The following conversion equation will also be needed in your program.

<div align="center">

1 kilogram = 2.2046 pounds
1 inch = 2.54 centimeters

</div>

Problem Constants:
   None.

Problem Inputs:

   Weight in pounds
   Height in inches

Problem Outputs:

   BMI

Other variables:

   Weight in kilograms
   Height in meters

PART a:
   ☐ Prompt the user to enter a value for *weight in pounds* and *height in inches*.
   ☐ Compute conversions.
   ☐ Calculate
   ☐ Display *BMI*.

Sample Input/Output:

```
Enter the height in inches: 70
Enter the weight in pounds: 200
The BMI is: 28.6970
```

> New commands:
> `scanf()`
> `printf()`

PART b: Problem modification:

Before you start writing your program:

Read the Software Development Plan to plan your solution to the assignment problem.

Save your assign02a.c as assign02b.c. Add an appropriate problem statement in the comments, and add new variables and statements that satisfy the new requirements.

Program: assign02b.c

Once you have displayed the BMI, you become curious as to what weight is needed to have a BMI at a particular level. So, you decided to modify your program to compute a target weight given the already entered height and a target BMI. To do this you will need to rewrite the BMI equation so that it solves for mass (weight) given the already entered height and a BMI provided by the user. Remember the computed mass (weight) will be in kilograms. You will need to convert the mass to pounds before displaying it.

http://en.wikipedia.org/wiki/File:Body_mass_index_chart.svg

Additional Problem Constants:
None.

Additional Problem Inputs:
BMI

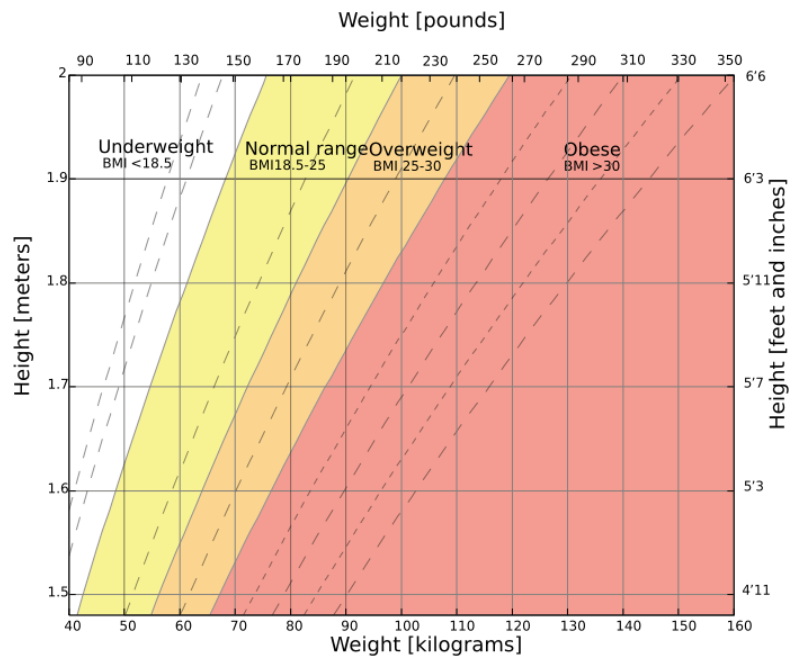### Additional Problem Outputs:
Weight in pounds

PART b:
☐ Prompt the user to enter a value for *BMI*.
☐ Compute *weight*.
☐ Compute conversions.
☐ Display *weight*.

Sample Input/Output:

```
Enter the height in inches: 70
Enter the weight in pounds: 200
The BMI is: 28.6970

Enter the target BMI: 25
The target weight is: 174.2342
```

General Instructions:
☐ Insert comments at the top and throughout each file
　o Include the follow comments at the beginning of this (and ALL) files.
　　// your name
　　// assignment number
　　// date you completed the assignment
　　// statement(s) about collaboration
　　// a short narrative about what the file does
　o Use the algorithm for comments throughout each file
☐ Use descriptive variable names.
☐ Use Sample Input/Output as a guide.

-7 points per file for absence of any of these required comments at the top

CAUTION!!!

Submit via Blackboard:

assign02a.c　　C program file
assign02b.c　　C program file

NOTE: Your submitted file(s) MUST be spelled and cased as instructed.