

COP 3223 Program #5: Pizza Shack (in C)

To ease into C, one of this week's programs will be a repeat of a program you wrote in Python, for which the python solution is posted. Thus, for Program A, your task amounts to translating a known python solution to C. The other two programs will be different and require you to write your programs from scratch.

Program A: How Much Dough to Order (dough.c)

The weight of dough (in pounds) necessary for a pizza shop is based on the sum of the areas of the top surfaces of the pizzas sold. For this program, your job will be assisting Pizza Shack in determining how much dough it should order for the week. Use the following constant in your program:

```
#define DOUGH_PER_SQFT 0.75
```

Pizza Shack will have small, medium and large pizzas, but they want the ability to change the radii of these pizza sizes (in inches), so your program will have to read in these three values as input from the user.

Your program will also prompt the user to enter how many small, medium and large pizzas are expected to be sold during the week.

Using these six input values, your program should calculate how many pounds of dough to order to make the pizzas!

Please use the following constants to aid in your calculation of each pizza's top surface area:

```
#define INCHES_PER_FEET 12
#define PI 3.141592654
```

You may assume the user will enter reasonable values for each of the six input prompts. All six input are guaranteed to be positive integers, **but print your result as a floating point number to three decimal places.**

Sample Run (User input in bold and italics)

What is the radius of your small pizza, in inches?

8

What is the radius of your medium pizza, in inches?

10

What is the radius of your large pizza, in inches?

12

How many small pizzas do you expect to sell this week?

40

How many medium pizzas do you expect to sell this week?

100

How many large pizzas do you expect to sell this week?

200

You need to order 676.751 pounds of dough this week.

Program B: Toppings to Buy (toppings.c)

Now that you've figured out how much dough to buy for the week, you want to figure out how much of each topping to buy. You would like for your program to work for all toppings (not just pepperoni), so you'll ask the user to enter the following information:

- 1) The percentage of pizzas that will use the topping.
- 2) The amount (in pounds) of the topping used on a single pizza (on average) that has the topping.
- 3) The total number of pizzas sold for the week.

For the purposes of this calculation, we are not differentiating between different sizes of pizzas. Thus, we can calculate the average number of pizzas that will have the topping using inputs 1 and 3, and coupling that information with input number 2, we can get an approximation in pounds of the amount of that topping needed.

Input Specification

1. The percentage of pizzas that use the topping will be a floating point number in between 0 and 100, inclusive.
2. The pounds of a topping used on a single pizza will be a floating point number in between 0 and 2, inclusive.
3. The number of pizzas sold for the week will be a positive integer less than or equal to 1000.

Output Specification

Print the output to 3 decimal places, in pounds, following the sample program run shown below.

Sample Program Run (User Input in Bold and Italics)

What percentage of pizzas use the topping?

33.33

How many pounds of the topping go into each pizza with it?

.24

How many pizzas do you expect to sell for the week?

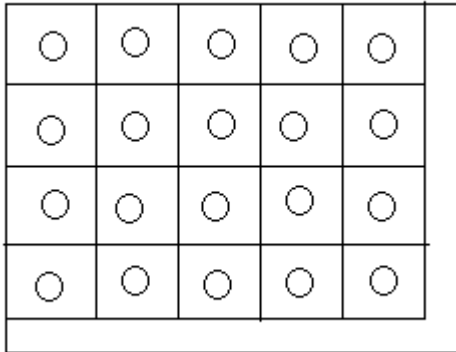
100

You should order 7.999 pounds of the topping.

Note: Please come up with several of your own test cases. This test case in particular is NOT a representative sample of all possible test cases.

Program C: Placing Pepperonis (pepperoni.c)

You want to have a program that calculates the number of pepperonis to place on rectangular pizzas. For each pizza, you want the user to be able to choose the “density” of pepperonis according to the following design:



Essentially, each pepperoni is roughly centered in a square of the pizza of some given size (perhaps 35 mm by 35 mm). We portion the rectangular pizza into as many rows and columns as we can, of this fixed size. Each of these square cells of the pizza get one piece of pepperoni. Depending on the dimensions of the pizza, some room may be leftover on the right side and bottom of the pizza that are too small to form the squares desired. These areas do not get any pepperonis.

Write a program that takes in the length and width of the pizza in millimeters, as well as the size of the bounding square for one pepperoni, in millimeters, and calculates the total number of pepperonis needed for the pizza.

Input Specification

1. The length and width of the pizza will be positive integers in millimeters in between 100 and 1000, inclusive.
2. The size of a dimension of the square bounding area of a pepperoni will be a positive integer in millimeters in between 20 and 100, inclusive.

Output Specification

Print a positive integer output that represents the number of pepperonis that should be placed on the pizza, according to the desired scheme proposed above.

Sample Program Run (User Input in Bold and Italics)

What is the length of your pizza(in mm)?

300

What is the width of your pizza(in mm)?

200

How long should each square cell bounding pepperoni be(in mm)?

35

Your pizza should have 40 pepperoni(s).

Deliverables

Please submit three separate **.c files** for your solutions to these problems via WebCourses by the designated due date:

Program A: **dough.c**

Program B: **toppings.c**

Program C: **pepperoni.c**