

Programming Challenges

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1. Name, Age, and Annual Income

Write a program that declares the following:

- a `String` variable named `name`
- an `int` variable named `age`
- a `double` variable named `annualPay`

Store your age, name, and desired annual income as literals in these variables. The program should display these values on the screen in a manner similar to the following:

```
My name is Joe Mahoney, my age is 26 and  
I hope to earn $100000.0 per year.
```

2. Name and Initials

Write a program that has the following `String` variables: `firstName`, `middleName`, and `lastName`. Initialize these with your first, middle, and last names. The program should also have the following `char` variables: `firstInitial`, `middleInitial`, and `lastInitial`. Store your first, middle, and last initials in these variables. The program should display the contents of these variables on the screen.

3. Personal Information

Write a program that displays the following information, each on a separate line:

- Your name
- Your address, with city, state, and ZIP
- Your telephone number
- Your college major

Although these items should be displayed on separate output lines, use only a single `println` statement in your program.

4. Star Pattern

Write a program that displays the following pattern:

```
*  
***  
*****  
*****  
***  
*
```

5. Sales Prediction

The East Coast sales division of a company generates 62 percent of total sales. Based on that percentage, write a program that will predict how much the East Coast division will generate if the company has \$4.6 million in sales this year. Hint: Use the value 0.62 to represent 62 percent.

6. Land Calculation

One acre of land is equivalent to 43,560 square feet. Write a program that calculates the number of acres in a tract of land with 389,767 square feet. Hint: Divide the size of the tract of land by the size of an acre to get the number of acres.

7. Sales Tax

Write a program that will ask the user to enter the amount of a purchase. The program should then compute the state and county sales tax. Assume the state sales tax is 4 percent and the county sales tax is 2 percent. The program should display the amount of the purchase, the state sales tax, the county sales tax, the total sales tax, and the total of the sale (which is the sum of the amount of purchase plus the total sales tax). Hint: Use the value 0.02 to represent 2 percent, and 0.04 to represent 4 percent.

8. Cookie Calories

A bag of cookies holds 40 cookies. The calorie information on the bag claims that there are 10 servings in the bag and that a serving equals 300 calories. Write a program that lets the user enter the number of cookies he or she actually ate and then reports the number of total calories consumed.

9. Miles-per-Gallon

A car's miles-per-gallon (MPG) can be calculated with the following formula:

$$\text{MPG} = \text{Miles driven}/\text{Gallons of gas used}$$

Write a program that asks the user for the number of miles driven and the gallons of gas used. It should calculate the car's miles-per-gallon and display the result on the screen.

10. Test Average

Write a program that asks the user to enter three test scores. The program should display each test score, as well as the average of the scores.

11. Circuit Board Profit

An electronics company sells circuit boards at a 40 percent profit. If you know the retail price of a circuit board, you can calculate its profit with the following formula:

$$\text{Profit} = \text{Retail price} \times 0.4$$

Write a program that asks the user for the retail price of a circuit board, calculates the amount of profit earned for that product, and displays the results on the screen.

12. String Manipulator

Write a program that asks the user to enter the name of his or her favorite city. Use a `String` variable to store the input. The program should display the following:

- The number of characters in the city name
- The name of the city in all uppercase letters
- The name of the city in all lowercase letters
- The first character in the name of the city

13. Restaurant Bill

Write a program that computes the tax and tip on a restaurant bill. The program should ask the user to enter the charge for the meal. The tax should be 6.75 percent of the meal charge. The tip should be 20 percent of the total after adding the tax. Display the meal charge, tax amount, tip amount, and total bill on the screen.

14. Male and Female Percentages

Write a program that asks the user for the number of males and the number of females registered in a class. The program should display the percentage of males and females in the class.

Hint: Suppose there are 8 males and 12 females in a class. There are 20 students in the class. The percentage of males can be calculated as $8 \div 20 = 0.4$, or 40%. The percentage of females can be calculated as $12 \div 20 = 0.6$, or 60%.

15. Stock Commission

Kathryn bought 600 shares of stock at a price of \$21.77 per share. She must pay her stockbroker a 2 percent commission for the transaction. Write a program that calculates and displays the following:

- The amount paid for the stock alone (without the commission)
- The amount of the commission
- The total amount paid (for the stock plus the commission)

16. Energy Drink Consumption

A soft drink company recently surveyed 12,467 of its customers and found that approximately 14 percent of those surveyed purchase one or more energy drinks per week. Of those customers who purchase energy drinks, approximately 64 percent of them prefer citrus-flavored energy drinks. Write a program that displays the following:

- The approximate number of customers in the survey who purchase one or more energy drinks per week
- The approximate number of customers in the survey who prefer citrus-flavored energy drinks

17. Ingredient Adjuster

A cookie recipe calls for the following ingredients:

- 1.5 cups of sugar
- 1 cup of butter
- 2.75 cups of flour

The recipe produces 48 cookies with these amounts of the ingredients. Write a program that asks the user how many cookies he or she wants to make, and then displays the number of cups of each ingredient needed for the specified number of cookies.

18. Word Game

Write a program that plays a word game with the user. The program should ask the user to enter the following:

- His or her name
- His or her age