

4. Mr. Brown has given a test to his class. He would like to have the average score for the class as well as the highest and lowest scores. Develop a solution to calculate and print out these values. (Use a trip value to stop the processing of the loop.)
5. Mary Smith, a student, has borrowed \$3,000 to help pay her college expenses. After setting up a budget, \$85 was the maximum monthly payment she could afford to make on the loan. Develop a solution to calculate and print the interest, the principal, and the balance on the loan per month. Other information she would like to know is the number of years and months it will take to pay the loan back and the total interest she will pay during that period. The interest rate is 1% per month on the unpaid balance. Keep in mind these formulas:

$$\text{interest normal} = \text{balance} * \text{interest rate}$$

$$\text{payment} = \text{balance} - \text{interest}$$

$$\text{new balance} = \text{balance} - \text{payment}$$

6. Develop a solution to flip a coin a given amount of times and then print the number of heads and the number of tails. The equation to toss the coin is

$$\text{Coin} = \text{Integer}(\text{Random} * 2) + 1$$

(See page 22 for explanation of this formula.) When *Coin* = 1 the toss is heads, and when *Coin* = 2 the toss is tails. *Random* returns a number between 0 and 1, including 0 but not 1. Therefore, when *Random* is less than 0.5, *Coin* will equal 1; and when *Random* is greater than or equal to 0.5 and less than 1, *Coin* will equal 2.

7. Develop a solution to calculate a student's grade average for one semester. The letter grades should be entered and the grade average printed out. An A is equivalent to 4 grade points, a B is 3 grade points; a C is 2 grade points, a D is 1 grade point, and an F is zero grade points.
8. Write a solution to tell the user whether a number is a palindrome. (A palindrome is a number that is the same written both forward and backward, such as 81318.)
9. Write a solution to tell the user whether a string is a palindrome. (A palindrome string is a list of characters that spell the same word(s) forward or backward, such as *wow* or *radar*.)
10. Write a solution to tell the user whether a number is a prime number.
(Hint: A prime number can be divided only by one and itself. There are no other factors.)
11. Write a solution to print out all of the factors of a number. Specify to the user whether the number is a prime number, that is, if the only factors are one and itself.
12. Using the recursion technique, develop a solution to calculate the power of a number, given the number and the exponent.
13. Write a solution to find the average miles per gallon on a car after six fillups at a gas station. Additional data kept included the number of gallons of gas at each fillup, the starting odometer reading, and the odometer reading at each fillup.
14. In problem 13, which loop did you use? Justify why you used that particular loop and not one of the other two. Did you need all of the data that was collected? Why or why not?
15. Mr. Jones, a history instructor, would like to know the percentage increase in the population of the United States per decade given the first decade and the last