

METHODS

1. Twin primes are a pair of prime numbers that differ by 2. For example, 3 and 5 are twin primes, 5 and 7 are twin primes, and 11 and 13 are twin primes. Write a program to find all twin primes less than 1,200. Display the output as follows:

(3, 5)

(5, 7)

2. Write a class that contains the following two methods:

```
public static double poundToKilogram(double pound)
```

```
/** Convert from kilograms to pounds */
```

```
public static double kilogramToPound(double kilogram)
```

The formula for the conversion is:

```
pound = 0.453 * kilogram
```

```
kilogram = 2.204 * pound
```

Write a test program that invokes these methods to display the following tables:

Kilograms	Pounds		Pounds	Kilograms
1	2.2		20	9.09
3	6.6		25	11.36
...				
197	433.4		510	231.82
199	437.8		515	234.09

3. Some websites impose certain rules for passwords. Write a method that checks whether a

string is a valid password. Suppose the password rules are as follows:

- A password must have at least ten characters.

- A password consists of only letters and digits.

- A password must contain at least three digits.

Write a program that prompts the user to enter a password and displays **Valid Password** if the rules are followed or **Invalid Password** otherwise.

4. An emirp (prime spelled backward) is a nonpalindromic prime number whose reversal is also a prime. For example, 17 is a prime and 71 is a prime, so 17 and 71 are emirps. Write a program that displays the first 120 emirps. Display 10 numbers per line, separated by exactly one space, as follows:

```
13 17 31 37 71 73 79 97 107 113
149 157 167 179 199 311 337 347 359 389
...
```

5. Write a method with the following header to format the integer with the specified width.

```
public static String format(int number, int width)
```

The method returns a string for the number with one or more prefix 0s. The size of the string is the width. For example, `format(34, 4)` returns `0034` and `format(34, 5)` returns `00034`. If the number is longer than the width, the method returns the string representation for the number. For example, `format(34, 1)` returns `34`. Write a test program that prompts the user to enter a number and its width, and displays a string returned by invoking `format(number, width)`.

SPOT

Write a method that computes future investment value at a given interest rate for a specified number of years. The future investment is determined using the formula

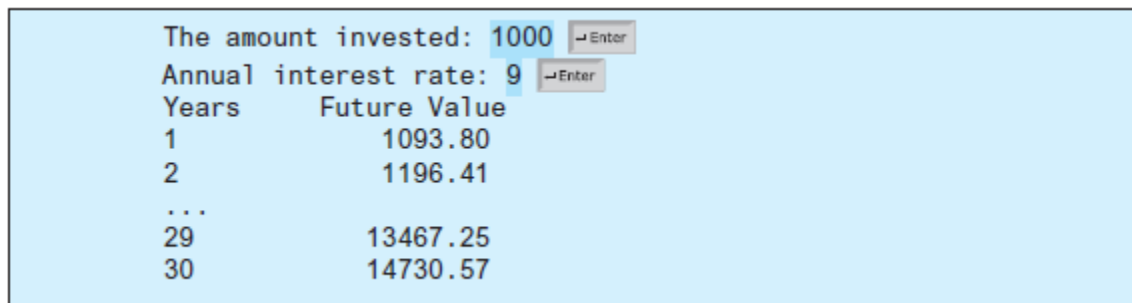
$$\text{futureInvestmentValue} = \text{investmentAmount} \times (1 + \text{monthlyInterestRate})^{\text{numberOfYears} * 12}$$

Use the following method header:

```
public static double futureInvestmentValue( double investmentAmount, double  
monthlyInterestRate, int years)
```

For example, `futureInvestmentValue(10000, 0.05/12, 5)` returns `12833.59`.

Write a test program that prompts the user to enter the investment amount (e.g., 1,000) and the interest rate (e.g., 9%) and prints a table that displays future value for the years from 1 to 30, as shown below:



The amount invested:	1000	Enter
Annual interest rate:	9	Enter
Years	Future Value	
1	1093.80	
2	1196.41	
...		
29	13467.25	
30	14730.57	