

Problem Set 01

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Exercise 1. Write a program that displays the following pattern:

```

  J      A      V      V      A
  J      A A     V      V      A A
J  J     AAAAA   V  V     AAAAA
J  J     A      A      V      A      A

```

Exercise 2. π can be calculated using the following equation:

$$\pi = 4 \times \left(1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} + \dots \right)$$

Use the infinite series to approximate π . Calculate it twice - once using 1.0 and again using 1 for the numerators. Are the results the same? If they aren't, how do you suspect the calculation differs? Write your response as a comment in the program. You can create a multi-line comment by enclosing it with `/* CONTENT */`

Exercise 3. Write a program that displays the area and perimeter of a rectangle with a width of 4.5 and a height 7.9 using the following equation:

$$\text{area} = \text{width} \times \text{height}$$

Exercise 4. Write a program that reads the subtotal and gratuity rate, then compute the gratuity and total. For example, if the user enters 10 for the subtotal and 15% for gratuity rate, the program displays \$1.5 as gratuity and \$11.5 as total. Here is the sample run:

```

Enter the subtotal (ex. 10.50): 9.50
Enter the percent gratuity (ex. 15 for 15%): 20
The gratuity is $1.9 and the total is $11.4

```

Exercise 5. Prompt: Write a program that reads an integer between and 1000 and adds all the digits in the integer. For example, if an integer is 932, the sum of all its digits is 14. Below is a sample run:

```

Enter a positive integer < 1000: 456
The sum of the digits is 15

```

Hint: use the `%` operator to extract digits, and use the `/` operator to remove the extracted digit. For instance, `932 % 10 = 2` and `932 / 10 = 93`.