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Problem 5

Write a program to ask the user to enter many positive integers. For each entered number, check whether it is a prime number and print out “It is a prime” or “It is not a prime” accordingly. If the user enters “done”, print out the sum of all prime numbers.

Your program should pass the following tests.

Example 1 (user inputs are in *italics*)

```
Enter a number 2
It is a prime
Enter a number 3
It is a prime
Enter a number 4
It is not a prime
Enter a number done
The sum of all primes is  5
```

Example 2 (user inputs are in *italics*)

```
Enter a number 2
It is a prime
Enter a number 4
It is not a prime
Enter a number done
The sum of all primes is  2
```

Example 3 (user inputs are in *italics*)

```
Enter a number 4
It is not a prime
Enter a number 6
It is not a prime
Enter a number 8
It is not a prime
Enter a number done
The sum of all primes is  0
```

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Test cases for Problem 5

No.	Input	Expected Output
1	2 3 4 done	The sum of all primes is 5
2	2 4 done	The sum of all primes is 2
3	4 6 8	The sum of all primes is 0

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Problem 6

Write a program to ask which sports a student plays. Then for each sport, print out the list of students playing that sport. Use the following conventions:

- Each time the program asks "`who plays what?`", the user is supposed to respond with a student's name and the set of sports he/she plays. A space is used to separate the name with the sports, while different sports are separated by commas. For example, "*Alice swim,tennis*" means that Alice plays two sports: swim and tennis.
- Each sport is given by a sequence of characters without spaces or commas. For example table tennis should be given by *tabletennis*.
- If the user inputs "done", the program does the required printing.

Your program should pass the following tests.

Example 1 (user inputs are in *italics*)

```
who plays what?Alice swim,tennis
who plays what?done
swim is played by  ['Alice']
tennis is played by  ['Alice']
```

Example 2 (user inputs are in *italics*)

```
who plays what?Alice swim,tennis
who plays what?Alex tennis
who plays what?Bob swim
who plays what?done
swim is played by  ['Alice', 'Bob']
tennis is played by  ['Alice', 'Alex']
```

Example 3 (user inputs are in *italics*)

```
who plays what?Alice swim,tabletennis
who plays what?Alex tennis
who plays what?done
tabletennis is played by  ['Alice']
swim is played by  ['Alice']
tennis is played by  ['Alex']
```

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Test cases for Problem 6

No.	Input	Expected Output
1	*Alice swim,tennis* *done*	tennis is played by ['Alice'] swim is played by ['Alice']
2	Alice swim,tennis Alex *tennis* *Bob swim* *done*	swim is played by ['Alice', 'Bob'] tennis is played by ['Alice', 'Alex']
3	*Alice swim,tabletennis* Alex tennis *done*	tabletennis is played by ['Alice'] swim is played by ['Alice'] tennis is played by ['Alex']

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Problem 7

Write a program that repeatedly calculates volumes of cylinders. In each iteration, the program takes the radius (r) and height (h) from a user, calculates, and outputs the cylinder volume (V). The program repeatedly calculates until the user inputs "done". The formula that is used to find the volume of the cylinder is

$$V = \pi r^2 h$$

- The radius and height inputs must be zero or positive values.
- If the input is invalid, the program will print "Invalid inputs" and continue taking input.
- All the number values are printed with two digits after the decimal point.
- The program uses the pi (π) constant from the Python math library.

The program output must be formatted the same as in the examples below.

Example 1 (user inputs are in *italics*)

```
Input radius and height: 8 15
The cylinder volume is 3015.93
Input radius and height: 15 8
The cylinder volume is 5654.87
Input radius and height: 15 4
The cylinder volume is 2827.43
Input radius and height: 15 0
The cylinder volume is 0.00
Input radius and height: done
```

Example 2 (user inputs are in *italics*)

```
Input radius and height: 10 1.5
The cylinder volume is 471.24
Input radius and height: 10 3
The cylinder volume is 942.48
Input radius and height: done
```

Example 3 (user inputs are in *italics*)

```
Input radius and height: -1 20
Invalid inputs
Input radius and height: 10 -1
Invalid inputs
Input radius and height: 0 5.5
The cylinder volume is 0.00
Input radius and height: 10 5.5
The cylinder volume is 1727.88
Input radius and height: hello
Invalid inputs
Input radius and height: done
```

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Problem 8

Write a program that repeatedly accepts integers until a user inputs “done”. The program then outputs the highest sum of three numbers and the smallest sum of three numbers.

- If the input number is invalid, the program will print “Invalid input” and continue taking input.
- If there are not enough numbers from the inputs, the program then outputs a message “Not enough inputs”.

The program output is formatted the same as in the examples below.

Example 1 (user inputs are in *italics*)

```
Input: 1
Input: 1
Input: 2
Input: 2
Input: 3
Input: done
The highest sum and the smallest sum are 7 and 4.
```

Example 2 (user inputs are in *italics*)

```
Input: -50
Input: 10
Input: 100
Input: 100
Input: done
The highest sum and the smallest sum are 210 and 60.
```

Example 3 (user inputs are in *italics*)

```
Input: 5
Input: 5.5
Invalid input
Input: cat
Invalid input
Input: DONE
Invalid input
Input: -20
Input: 0
Input: done
The highest sum and the smallest sum are -15 and -15.
```

Example 4 (user inputs are in *italics*)

```
Input: 100
Input: 100
Input: done
Not enough inputs
```