Session 1: Variables and Statements

1. Objects and Types

```
[1]: 3
```

```
3
```

```
[2]: 'Hi'
```

```
'Hi'
```

```
[3]: type(3)
```

```
int
```

```
[4]: type('3')
```

```
str
```

```
[5]: int('3')
```

```
3
```

```
[6]: str(3)
```

```
'3'
```

Q1: What are the types of the following objects? a) `3.1` b) `3.0` c) `'3'` d) `True` e) `print`

2. Operators

```
[7]: 1+1
```

```
2
```

```
[8]: '1'+'1'
```

```
'11'
```

```
[9]: 1==1
```

```
True
```

```
[10]: 1=='1'
```

```
False
```

```
[11]: True+True
```

```
2
```

Q2: Use trial and error to figure out the meaning of the following operators: a) `**` b) `!=`

2.1 Order of Operations (Higher Rows have Precedence)

Operator	Examples
Parenthesized expressions	`( )`
Exponentiation	`**`
Positive/Negative	`+3 -2`
Multiplication/Division	`* /`
Addition/Subtraction	`+ -`
Bitwise operations	`& |`
Comparisons	`< <= > >= != ==`
Boolean NOT	`not`
Boolean AND	`and`
Boolean OR	`or`
Assignment	`=`

Q3: Without using a computer, predict the result of the following expressions. Then check your answers using the computer.
a) `5+3**2`
b) `5+(6>3)*2`
c) `4*(5-(2-1))+(6==1)`
d) `2*(2+1)+6/3+2**3`
e) `'3'+'2'`
f) `'3'+2`

3. Variables

The `a=` should not be read as "a is equal to" but as "associate the name 'a' with the object."

```
[12]: a='Hello world'
      a=a+'!'
      a
```

```
'Hello world!'
```

Q4: Without using a computer, predict the final value of x after executing the following sequence.

```
x=3-1
x=x+1
x=2**x
```

4. Keyboard Input and Screen Output

```
[13]: a=input('Please enter your name: ')
      print('Hello',a,'!')
```

```
Please enter your name: Peng
Hello Peng !
```

```
[14]: # f-string formating allows for better control
      name='Peng'
      print(f'Hello {name}!')
```

```
Hello Peng!
```

Q5. Practicing Input and Print

a) Write a program that asks the user for their first name and last name separately, then display their full name as in the sample output.

[15]:

```
Enter first name: Peng
Enter last name: Shi
Your full name is Peng Shi.
```

b) Write a program that asks the user for the quantity sold and the price per unit and multiply them to calculate the total revenue. (Hint: you need to convert from string to float before multiplying.)

[16]:

```
Input quantity sold: 4
Input the price per unit: 3.5
Total revenue is 14.0.
```

Q6. Calculator for Present Value

Write a program that calculates the present value of a certain investment, which will pay off a cash value of C in n years. The program should ask the user to input the final cash value C, the annual interest rate r (in percentage points), and the number of years n. The formula for present value V is

$$V = \frac{C}{(1 + \frac{r}{100})^n}$$

[17]:

```
Input final cash value: 1000000
Input annual interest rate in percent: 5
Input number of years: 10
The present value is $613913.2535407591.
```