Handout for Session 2

A. Type of object

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

```
int
```

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

B. Operators

```
[2]: 2+5*5
```

```
27
```

Q2: What do the following operators do when used with numbers? a) `*` b) `/` c) `//` d) `**` e) `==` f) `!=` g) `>=`
Q3: What do the following operators do when used with strings? a) `+` b) `==` c) `!=` d) `>` e) `>=`
Q4: Predict the output of the following expressions: a) `3**2+5` b) `5+(6>3)*2` c)`4*(5+2-1)+(6==1)` d) `6//4` e) `'3'+'2'` f) `'3'+2`

C. Variables

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

```
'Hello world!'
```

Q5: Explain each of the following and predict what will be the final output after executing all three sequentially. a) `x=3-1` b) `x=x+1` c) `x=2**x`

D. Interacting with User

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

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

E. Type Conversion

```
[5]: a=str(3)
     a
```

```
'3'
```

```
[6]: q=int(input('Input quantity sold:'))
     p=float(input('Input the profit of each unit:'))
     print('Total profit is',p*q)
```

```
Input quantity sold:40
Input the profit of each unit:5
Total profit is 200.0
```

Case 1. 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

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

```
Input the final cash value: 1000000
Input the annual interest rate in percent: 4.5
Input the number of years: 10
The present value is 643927.682030043
```

```
[1]: reward=float(input('Input the final cash value: '))
     interest=float(input('Input the annual interest rate in percent: '))
     years=float(input('Input the number of years: '))
     PV=reward/(1+interest/100)**years
     print('The present value is',PV)
```

```
Input the final cash value: 1000000
Input the annual interest rate in percent: 4.5
Input the number of years: 10
The present value is 643927.682030043
```

F. Conditional Execution

```
[8]: password='Marshall'
     a=input('Input the access code:')
     if a==password:
         print('Correct access code.')
     else:
         print('Incorrect access code.')
```

```
Input the access code:USC
Incorrect access code.
```

Case 2. Basestock Policy in Inventory Management

Write a program that asks the user for the current inventory level. If the inventory is at least equal to 100, then output `Sufficient inventory. No need to order.` Otherwise, output `Order x units`, where `x` is 100 minus the inventory.

Sample output:

```
Current inventory: 75
Order 25 units
```

```
[1]: basestock=100
     inventory=input('Current inventory: ')
     inventory=int(inventory)
```

```
    if inventory>=basestock:
        print('Sufficient inventory. No need to order.')
    else:
        print('Order',basestock-inventory,'units.')
```

```
Current inventory: 25
Order 75 units.
```

Case 3. Wage Calculator for Payroll

Write a program that asks the user for how many hours they worked this week, and output their total weekly pay. Pay is calculated as follows: for the first 40 hours, the hourly pay is 10. After that there is a 50 percent bonus per additional hour worked.

Sample output:

```
Hours worked this week:42.5
Total pay this week is 437.5
```

```
[2]: baseWage=10
    bonus=5
    hours=input('Hours worked this week:')
    hours=float(hours)
    if hours<=40:
        pay=hours*baseWage
    else:
        pay=hours*baseWage+(hours-40)*bonus
    print('Total pay this week is',pay)
```

```
Hours worked this week:42.5
Total pay this week is 437.5
```

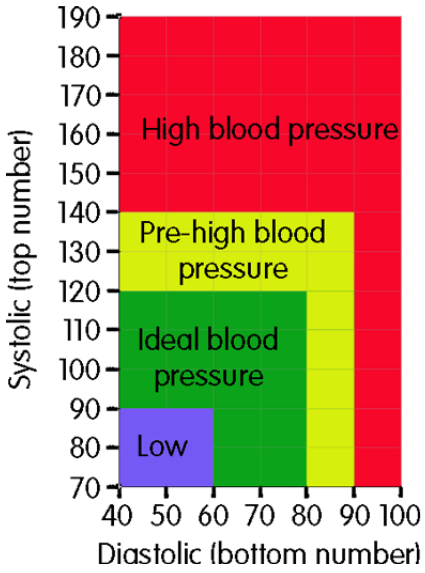
Additional Exercises for Session 2

Case 4. Blood Pressure Checker

Write a program that asks for the user's systolic and diastolic blood pressure, and output one of `LOW`, `IDEAL`, `PRE-HIGH` or `HIGH` according to the following chart.

```
[3]: high=float(input('Systolic blood pressure:'))
    low=float(input('Diastolic blood pressure:'))
    if low<=60 and high<=90:
        answer='LOW'
    elif low<=80 and high<=120:
        answer='IDEAL'
    elif low<=90 and high<=140:
        answer='PRE-HIGH'
    else:
        answer='HIGH'

    print('Your blood pressure is',answer)
```



Blood pressure chart

```
Systolic blood pressure:130
Diastolic blood pressure:90
Your blood pressure is PRE-HIGH
```

Case 5. Blood Sugar Checker

Write a program that asks the user how many hours they have fasted and their current blood sugar level. If they have fasted less than 2 hours, then output `You need to fast at least 2 hours to perform this test.` If they fasted at least 2 hours but less than 8 hours, then output `Your blood sugar level is high` if it is more than 140, and `Your blood sugar level is normal` otherwise. If they have fasted for at least 8 hours, then the threshold changes to 100 (instead of 140).

```
[5]: hours=float(input('How many hours have you fasted: '))
     level=float(input('What is your blood sugar level: '))
     high_msg='You blood sugar level is high.'
     low_msg='Your blood suguar level is normal.'
     if hours<2:
         print('You need to fast at least 2 hours to perform this test.')
     elif hours<8:
         if level>140:
             print(high_msg)
         else:
             print(low_msg)
     else:
         if level>100:
             print(high_msg)
         else:
             print(low_msg)
```

```
How many hours have you fasted: 3
What is your blood sugar level: 150
```

You blood sugar level is high.