Scientific Computing with Python Lab

2nd session(Jan 30, 2024)

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Announcement

Office Hour

Video Recording

- Check Panopto video of lab session page in Canvas

Announcement

Office Hour

My office hour

- Time : 9AM ~ 12PM on Thursday
- Location : 205 Crowley(can be switched to Zoom session)
- Other Office hours are operated by Professor Michael, TA Jiabao
- Feel Free to ask question!!!!

Today,

we are going to deal with

#conditionals : if, else, elif

Conditionals

With some conditions for certain operation

- We want to do operation only in certain condition or distinguish cases

ex1) $f(x) = \begin{cases} 1 \text{ if x is even} \\ 0 \text{ if x is odd} \end{cases}$

if A :

operation

- if (condition A) is satisfied ~, (operation)

Conditionals

About conditional statements

- Equality : ==
- Inequality : !=
- less than : <
- less or equal : <=
- greater than : >
- greater or equal : >=
- ex) if a is smaller than 2 → if a < 2:

1. a = 3.5

2. If a is smaller than 5, update a by adding 1 to the number

3. print('a is %.1f'%a)

Let's do exercise!

Conditionals

With 2 options

- We are given 2 options : situation A and the others

if A :

if (condition) is satisfied, (operation for A)

else :

if (condition) is **not** satisfied, (operation for the other)

1. a = 3

2. If a is bigger than 2, print(“a>2”).
   Otherwise print(“a<=2”)

Let’s do exercise!

Practice
(5 minutes)

1. Get an input with the message : **please enter the number(integer)**.

2. If the number is even, print(“It is even”). Otherwise print(“It is odd”)

Conditionals

Logical operator

Examples : given 2 conditions in a row

- ex1. If **2 < a < 5**, print(“a is between 2 and 5”) -> works!
- ex2. If **a is negative and a^2 > 4**, print(“a is a negative number whose absolute value is larger than 2”)
- ex3. If **a >5 or a<2**, print(“a is not between 2 and 5”)

Logical Arithmetic

- and, & : satisfying both conditions, intersection
- or, | : satisfying at least one condition, union
- not : opposite the condition, complement

Let’s do an exercise

1. get a two inputs with the message : enter the numbers
2. If a^2 = b or b^2 = a, print(“they are in square root relation”)
3. check with 2 and 4

Practice
(5 minutes)

1. Get an input with the message : enter an integers

2. Check whether the number is negative number whose absolute value is bigger than 3

3. Check with -2

Hint : convert to absolute value -> abs(a)

Conditionals

With 3 or more options

- We are given more than options : situation A,B,C (and others)

if A~ :

elif :

- giving another condition, but excluding if condition

elif :

- giving another condition, but excluding previous conditions

else :

- all other cases excluding all previous conditions

1. 2 Inputs(a,b) : Enter the numbers

2. if a square is b or b square is a,
   print(“they are in square root relation”)

3. check with 2 and 4

Practice

Should we end up with ‘else’ statement

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Ans: No! It’s only used for the case when the operations is all excluding previous conditions

Can we use multiple ‘if’ operators?

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Ans: Yes! Sometimes you should!

If vs elif

Exclusiveness

- **elif** depends on the previous conditionals : excluding previous conditions

- **If** does not depend on the previous conditionals : whatever conditions were added, the operation be done

1. a = 3
2. If a < 0, print : a < 0
3. If 0<a<=5 print a is between 0 and 5
4. If 5<a<=10 print a is between 5 and 10
5. a>11 print a is larger than 11

Let’s do exercise

1. 3 Inputs(a,b,c)

2. if b^2-4ac>0 print(“a*x^2+b*x+c has two distinct real roots”)

3. if b^2-4ac=0 print(“a*x^2+b*x+c has two same real roots”)

4. if b^2-4ac<0 print(“a*x^2+b*x+c has two imaginary roots”)

Practice (5 minutes)