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Teaching China's next generation to express themselves in code Malay Mail Online - 17 Oct 2017
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Malay Mail Online - 17 Oct 2017
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Dubai offers free coding education to all Arab kids
Startup MGZN (press release) (blog) - 28 Oct 2017
The Mohammed bin Rashid Al Maktoum Global Initiatives foundation (MBRGI) has announced it would sponsor the free computer coding ...
PROGRAMMING 4 ALL
@TU DELFT
WHAT IS PROGRAMMING?
HOW TO DRAW AN OWL?
HOW TO DRAW AN OWL?

DRAW TWO CIRCLES

DRAW THE REST OF THE OWL
HOW TO DRAW AN OWL?

```python
var = 'Panda'
if var == "panda":
    print("Cute!")
elif var == "Panda":
    print("Regal!")
else:
    print("Ugly...")
```
HOW TO DRAW AN OWL?

```python
var = 'Panda'
if var == "panda":
    print("Cute!")
elif var == "Panda":
    print("Regal!")
else:
    print("Ugly...")
```

Assume \(s\) is a string of lower case characters.

Write a program that prints the longest substring of \(s\) in which the letters occur in alphabetical order. For example, if \(s = 'azcbobobegghakl'\), then your program should print

Longest substring in alphabetical order is: beggh
WHAT IS PROGRAMMING?
PROGRAMMING IS MANY THINGS!
PROGRAMMING IS . . .

➤ Syntax

➤ Concepts

➤ Problem solving
for i in range(0, 15):
    print(i)
for i in range(0, 15):
    print(i)
for i in range(0, 15):
    print(i)
for i in range(0, 15):
    print(i)
for i in range(0, 15):
    print(i)
CONCEPTS

```python
for i in range(0, 15):
    print(i)
```

```python
i = 0
while i < 15:
    print(i)
    i = i + 1
```
PROBLEM SOLVING
PROBLEM SOLVING
# The main function to sort an array of given size

def heapSort(arr):
    n = len(arr)

    # Build a maxheap.
    for i in range(n, -1, -1):
        heapify(arr, n, i)

    # One by one extract elements
    for i in range(n-1, 0, -1):
        arr[i], arr[0] = arr[0], arr[i]  # swap
        heapify(arr, i, 0)
WHAT CAN WE LEARN FROM LANGUAGE?
PROGRAMMING IS . . .

➤ Syntax

➤ Concepts

➤ Problem solving
PROGRAMMING IS LIKE WRITING

➤ Syntax — Spelling

➤ Concepts — When to use passive tense

➤ Problem solving — Write a convincing essay
LANGUAGE

MEMORIZATION

AUTOMATION

REASONING
LANGUAGE

MEMORIZATION

AUTOMATION

REASONING

c-a-r = “car”

a-p-e = “eep”
**LANGUAGE**

**MEMORIZATION**

\[ c-a-r = \text{“car”} \]

\[ a-p-e = \text{“eep”} \]

**AUTOMATION**

\[ \text{the ape drives a car} \]

**REASONING**
c-a-r = “car”
a-p-e = “eep”

the ape drives a car

write a story about a gorilla
PROGRAMMING . . . ?

MEMORIZATION

AUTOMATION

REASONING
PROGRAMMING...?

MEMORIZATION

AUTOMATION

REASONING

print(12)
<table>
<thead>
<tr>
<th>MEMORIZATION</th>
<th>AUTOMATION</th>
<th>REASONING</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>print(12)</code></td>
<td><code>if x == 5:</code></td>
<td><code>else</code></td>
</tr>
<tr>
<td></td>
<td><code>print(&quot;five&quot;)</code></td>
<td><code>print(&quot;nope!&quot;)</code></td>
</tr>
<tr>
<td>MEMORIZATION</td>
<td>AUTOMATION</td>
<td>REASONING</td>
</tr>
<tr>
<td>--------------</td>
<td>------------</td>
<td>-----------</td>
</tr>
<tr>
<td><code>print(12)</code></td>
<td><code>if x == 5:</code></td>
<td><code>sort these numbers</code></td>
</tr>
<tr>
<td></td>
<td><code>    print(&quot;five&quot;)</code></td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>else</code></td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>    print(&quot;nope!&quot;)</code></td>
<td></td>
</tr>
</tbody>
</table>
print(12)

if x == 5:
    print("five")
else:
    print("nope!")

sort these numbers
MEMORIZATION

print(12)

AUTOMATION

if x == 5:
  print("five")
else:
  print("nope!")

REASONING

sort these numbers
MEMORIZATION = SYNTAX

Change the __ such that it prints the text Hello.

Sample Input:

Sample Output:
Hello

Code Challenge → Write a program, test using stdin → stdout

Time Limit: 15 seconds
Memory Limit: 256 MB

```
1 print('___')
2
3
4
5
6
```
MEMORIZATION = SYNTAX

Change the `__` such that it prints the text `Hello`.

Sample Input:

Sample Output:

Hello

Code Challenge — Write a program, test using stdin → stdout

Time Limit: 15 seconds
Memory Limit: 256 MB

```python
1 2
1 2
1 2
1 2
1 2
1 2
1 2
1 2
1 2
```
MEMORIZATION = SYNTAX

Change the __ such that it prints the text Hello.

Sample Input:

Sample Output:

Hello

Time Limit: 15 seconds
Memory Limit: 256 MB

```python
print('__Hello__')
```
AUTOMATION = STRUCTURE
Now that we know the structure of the if, let's explore it's meaning. When the condition is true, the body will be executed. If not, it will be skipped entirely.

```python
if 3 < 2:
    print("I am not printed") <- 3 < 2 is false
    print("Neither am I") <- all indented lines will be skipped

if 2 < 3:
    print("I will be printed") <- 2 < 3 is true
    print("So will I") <- all indented lines will be executed
```

Explore it in the next step.
Now that we know the structure of the if, let's explore it's meaning. When the condition is true, the body will be executed. If not, it will be skipped entirely.

```python
if 3 < 2:
    print("I am not printed")  # all indented lines will be skipped
    print("Neither am I")     # all indented lines will be skipped
```

```python
if 2 < 3:
    print("I will be printed")  # all indented lines will be executed
    print("So will I")          # all indented lines will be executed
```

Explore it in the next step.
EXPLORING!

Change the temperature such that Warm enough will be printed.

Sample Input:

Sample Output:

Warm enough
ERROR MESSAGES!
READING ERROR MESSAGES?

MEMORIZATION

AUTOMATION

REASONING
READING ERROR MESSAGES?

MEMORIZATION  AUTOMATION  REASONING
READING ERROR MESSAGES?

MEMORIZATION

ape = “eep”

parse error unexpected EOF = “) missing”
WITH EVERY SYNTAX ELEMENT, WE SHOW AND EXPLAIN
WITH EVERY SYNTAX ELEMENT, LEARNERS EXPERIENCE ERRORS
EXPERIENCING ERROR MESSAGES

Execute the code without the final round bracket and see what happens!

Do not fix the code straight away.

Sample Input:

Sample Output:

Code Challenge — Write a program, test using stdin → stdout

No. Time for the next try.

Failed. Runtime error
File "jailed_code", line 2

SyntaxError: unexpected EOF while parsing

Time Limit: 15 seconds
Memory Limit: 256 MB

```python
print(17)
```
SYNTAX ERROR?
ON LINE 2?
UNEXPECTED EOF?
WHILE PARSING
Here, Python tells us where the error is located, in line 2. Sadly, in this case this is not entirely correct, the error is in line 1. In some cases we will see later it is correct. It is often correct but not always.

SyntaxError:

Here Python explain the type of the error SyntaxError. You can think of them as spelling mistakes. You made a mistake in spelling Python correct, and therefor Python is now confused about what you mean.

We will see a variety of these errors and in your programming career you will see a lot more, I am sure :)

while parsing (can also be while scanning)

In this error you see 'while parsing' and in others you will see 'while scanning'. Those are different steps in the process of running Python on your computer, but for now, just think of them as 'reading'. So the error we just got:

", line 2
SyntaxError: unexpected EOF while parsing

Actually means:

In line 2 something weird happened.
You made a spelling mistake: unexpected EOF while reading.

EOF

So the only thing we still need to decipher now is EOF. It means 'end of file'. So the error means that Python reaches the end of the file while reading it, and did not expect to see the end of the file yet. This is because it was still looking for a closing round brackets.

Let's make another mistake and learn about a new error!
What are the smallest building blocks of learning to program?

How can we explain and practice those blocks?
1.1 Printing numbers  3 out of 5 steps passed  2 out of 4 points received

While programming you will often want to ‘print’ something to the screen. In Python, you use the `print()` function for that. It prints whatever is between the round brackets.

Like this:

```python
print(12)
```

Will result in printing:

```
12
```

Try it in the next step.
WE'RE HEADED FOR ADVENTURE!