

1. FIRST PROGRAM
2. VARIABLES
3. FUNCTIONS
4. DATA TYPES
5. EXPRESSIONS
6. CONDITIONALS
7. LOOPS
8. LISTS
9. FILES
10. DATA

The slides are meant as visual support for the lecture.  
They are neither a documentation nor a script.

Please do not print the slides.

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# FIRST PROGRAM

```
print("hello, world")
```

use functions

## built-in functions

```
print()  
input()  
...
```

## functions from built-in modules

```
math.sqrt()  
time.sleep()  
sys.exit()  
...
```

## external modules

```
requests.get()  
...
```

arguments / parameter

comments



```
# this is a comment  
print("hello, world")
```

```
# this is a comment  
print("hello, world") # another comment
```

```
'''  
a multi-line comment  
for longer descriptions  
'''  
print("hello, world")
```

bugs

syntax errors

runtime errors

user input

```
user_name = input("What's your name? ")
```

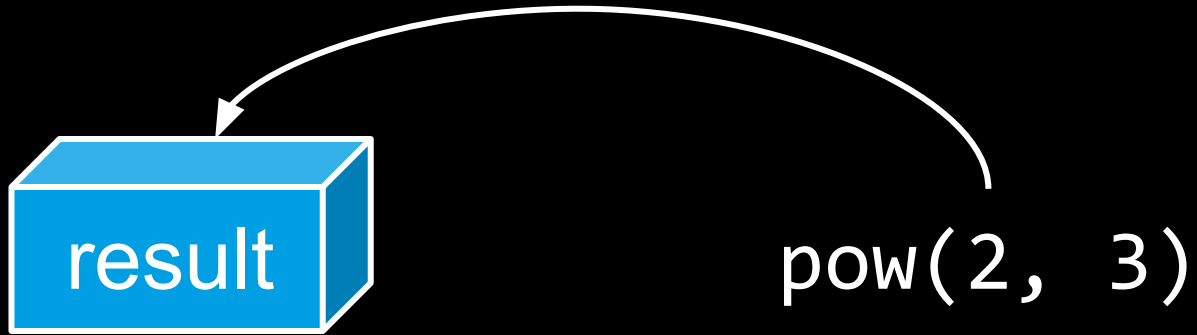


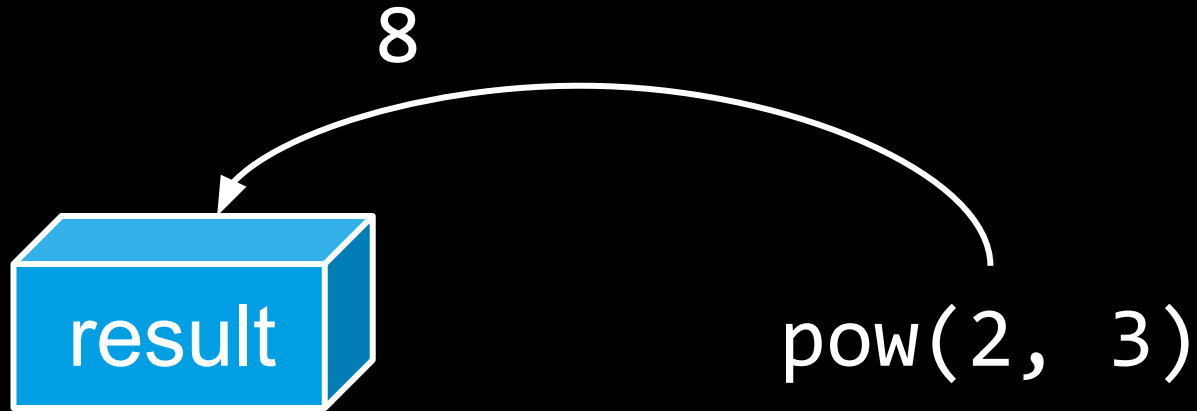
function's return values

```
result = pow(2, 3)
```

# VARIABLES







```
exp = 4  
result = pow(2, exp)
```

 = 4

result = pow(2, )



```
exp = 4  
result = pow(2, exp)  
print(result)
```

pseudocode

# step 1: determine exponent

# step 2: calculate power

# step 3: print result

problem solving → divide and conquer

# step 1: determine exponent

# step 2: calculate power

# step 3: print result

```
# step 1: determine exponent
```

```
exp = 4
```

```
# step 2: calculate power
```

```
# step 3: print result
```

```
# step 1: determine exponent
```

```
exp = 4
```

```
# step 2: calculate power
```

```
result = pow(2, exp)
```

```
# step 3: print result
```

```
# step 1: determine exponent
```

```
exp = 4
```

```
# step 2: calculate power
```

```
result = pow(2, exp)
```

```
# step 3: print result
```

```
print(result)
```



# FUNCTIONS

create functions

```
def greet():  
    print("hello")
```

parameters

```
def greet(name):  
    print(f"hello {name}")
```

format strings

parameter default values

```
def greet(name="world"):  
    print(f"hello {name}")
```



return a result

```
def make_greeting(name):  
    greeting = f"hello {name}"  
    return greeting
```

# EXPRESSIONS

operators

math

$$5 + 5$$

$$9 - 8$$

$$2 / 1$$

$$6 * 7$$

$$5 // 2$$

$$10 \% 3$$

$$2**3$$

logic

`2 == 1`

`2*2 > 1+3`

`2*2 >= 1+3`

`"A" < "B"`

`"A" < "B" and 2 == 1`

`"A" < "B" or 2 == 1`



data types

integer

float

boolean

string

```
strip()  
capitalize()  
title()
```

format strings

```
print(f"Hello {name}")
```



# CONDITIONALS

```
if <condition>:
```

```
...
```

```
if <condition>:
```

```
    ...
```

```
else:
```

```
    ...
```

```
if <condition>:  
    ...  
elif <condition>:  
    ...
```

# LOOPS

while loop

for loop