

SECTION 20: ADVANCED PYTHON PROJECTS AND DATA STRUCTURES - 41 minutes, 7 parts

1/7 Advanced Numbers

• outline

- -> more representations of numbers in Python
- -> builtin methods to do with numbers in Python
- -> hexadecimal numbers / binary numbers
- -> then the pow() function
- -> binary numbers
- -> there are links to the Wikipedia pages for these in the project ipynb file

• advanced numbers

- -> hex(12) <- to return a hexadecimal representation of the number 12
- -> bin(1234) <- to return a binary representation of the number

• builtin functions

- -> ** <- to the power
- -> pow(2,4) <- 2 to the 4 (this is the same as 2**4)
 - -> for power
- -> **pow(2,4,3) <- 2 to the 3 mod 3**
- -> the absolute value function
- -> abs(2)
- -> **round(3.1) <- to round a number off to zero decimal points**
 - -> round(3.1223423,2) <- to round the number off to two decimal points
- -> there is also a math module for more of these functions

The screenshot shows a Jupyter notebook interface with the following content:

hexadecimal

Using the function hex() you can convert numbers into a [hexadecimal](#) format:

```
In [4]: hex(246)
Out[4]: '0xf6'
```

```
In [5]: hex(512)
Out[5]: '0x200'
```

Binary

Using the function bin() you can convert numbers into their [binary](#) format.

```
In [19]: bin(1234)
Out[19]: '0b10011010010'
```

```
In [18]: bin(128)
Out[18]: '0b10000000'
```

pow()

With two arguments, equivalent to x^y . With three arguments, equivalent to $(x^y) \% z$, but may be more efficient (e.g. for longs).

```
In [8]: pow(2,4)
Out[8]: 16
```

round

Round a number to a given precision in decimal digits (default 0 digits). This always returns a floating point number.

```
In [11]: round(3)
Out[11]: 3.0
```

```
In [13]: round(3.1415926535, 2)
Out[13]: 3.14
```

Python has a built-in math library that is also useful to play around with in case you are ever in need of some mathematical operations. Explore the documentation [here!](#)

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Advanced Numbers

```
In [150]: hex(12)
Out[150]: '0xc'
```

```
In [151]: hex(512)
Out[151]: '0x200'
```

```
In [152]: bin(1234)
Out[152]: '0b10011010010'
```

```
In [155]: 2**4
```

```
Out[155]: 16
```

```
In [157]: pow(2,4,3)
```

```
Out[157]: 1
```

```
In [158]: abs(-3)
```

```
Out[158]: 3
```

```
In [159]: abs(2)
```

```
Out[159]: 2
```

```
In [158]: abs(-3)
```

```
Out[158]: 3
```

```
In [159]: abs(2)
```

```
Out[159]: 2
```

```
In [162]: round(3.9)
```

```
Out[162]: 4.0
```

```
In [163]: round(3.141592,2)
```

```
Out[163]: 3.14
```