DATES

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- In most large scale programming projects you will need to work with dates
- Luckily for us, Python has a nice built in module called **datetime** which we can use
- In order to use the datetime module we must import it
- To create a datetime object we use the **datetime constructor**
- Lets see some examples on the next slide

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Here we import the datetime module

Here we create 3 datetime instances. You can see here that the datetime constructor is pretty versatile

Here we print each day to the console window

This is the output

dates.py

```
1  from datetime import datetime
2
3  day1 = datetime(1964, 7, 11)
4  day2 = datetime(1890, 4, 6, 23)
5  day3 = datetime(2013, 2, 2, 4, 56, 32)
6
7  print(day1)
8  print(day2)
9  print(day3)
```

```
1964-07-11 00:00:00
1890-04-06 23:00:00
2013-02-02 04:56:32
```

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- As can be seen in the code example the datetime constructor is very versatile
  - This is because it makes use of default values
- The parameters are the following and must be supplied in this order
  - Year, month, day, hours, minutes, seconds, milliseconds
  - Hours, minutes, seconds and milliseconds all have the default value 0
  - **Year month and day must be provided**

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```
from datetime import datetime

#this example only supplies the year, month and day
day1 = datetime(1964, 7, 11)

#this example only supplies the year, month and day and hours
day2 = datetime(1890, 4, 6, 23)

#this example supplies the year, month, day, hours, minutes and seconds
day3 = datetime(2013, 2, 2, 4, 56, 32)
```

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- Here you can see some of the attributes the datetime object has

```
1   from datetime import datetime
2
3   some_date = datetime(1964, 7, 11)
4
5   print(some_date.day)
6   print(some_date.month)
7   print(some_date.year)
8   print(some_date.hour)
9   print(some_date.minute)
10  print(some_date.second)
```

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- We often need to work with the current date
- Datetime has a convenient method for just that, called now()
  - It actually also has .today() as well

```
1  from datetime import datetime
2
3  today = datetime.today()
4
5  current_time = datetime.now()
6
7  print(today)
8  print(current_time)
```

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- We will mostly be using dates for comparison

```
from datetime import datetime

day1 = datetime(2010, 10, 1)
day2 = datetime(2012, 10, 1)
day3 = datetime(2012, 10, 1)

print(day1 > day2) # prints False
print(day1 < day2) # prints True
print(day1 == day2) # prints False
print(day2 == day3) # prints True
```

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- Here is another example
- The closer a datetime is to the present the greater it is
  - You can think of it this way: The more total seconds a date has, the greater it is

```
from datetime import datetime

past = datetime(1995, 5, 3)
present = datetime.today()

print(past < present) # prints True
print(past == present) # prints False
print(past > present) # prints False
```

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- We can even subtract dates with the minus operator
  - This action will return a **time delta object**
  - That is a special object that denotes a time range between two dates

```
from datetime import datetime

past = datetime(1995, 5, 3)
present = datetime.today()

time_difference = present - past
```

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- We can also use the minus operator with one datetime object and one timedelta object
  - When the minus operator has one datetime object and one timedelta object as its operands it will return a new datetime object

the_day_before will contain a datetime object

```
1  from datetime import datetime, timedelta
2
3  today = datetime(2018, 11, 24)
4
5  the_day_before = datetime.date(today) - timedelta(days=1)
6
7  print(the_day_before)
```

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- The **plus** operator can be convenient when working with dates
  - The plus operator doesn´t use two datetimes objects as it operands
    - It uses one datetime object and one timedelta object and returns a datetime object

Tomorrow will contain a datetime object

```
1  from datetime import datetime, timedelta
2
3  today = datetime(2018, 11, 24)
4
5  tomorrow = datetime.date(today) + timedelta(days=1)
6
7  print(tomorrow)
```

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- This should be enough about dates for the project but if you are thirsty for more information here is a dear friend with a great video about dates
  - https://www.youtube.com/watch?v=eirjjyP2qcQ

- And here is a link to the official python documentation
  - https://docs.python.org/3/library/datetime.html#module-datetime