Python strftime()

In this article, you will learn to convert date, time and datetime objects to its equivalent string (with the help of examples)

The `strftime()` method returns a string representing date and time using date, time or datetime object.

Example 1: datetime to string using strftime()

The program below converts a `datetime` object containing current date and time to different string formats.

```
from datetime import datetime

now = datetime.now() # current date and time

year = now.strftime("%Y")
print("year:", year)

month = now.strftime("%m")
print("month:", month)

day = now.strftime("%d")
print("day:", day)

time = now.strftime("%H:%M:%S")
print("time:", time)

date_time = now.strftime("%m/%d/%Y, %H:%M:%S")
print("date and time:",date_time)
```

When you run the program, the output will something like be:

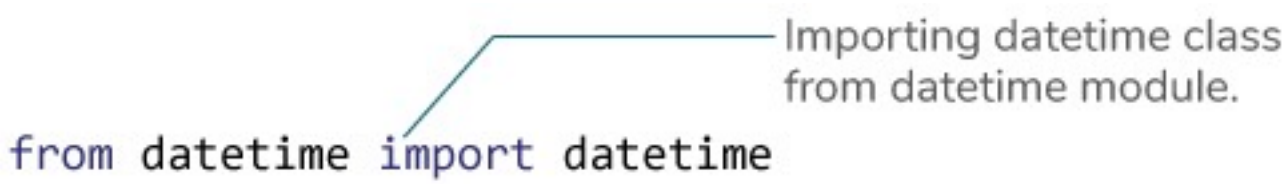
```
year: 2018
month: 12
day: 24
time: 04:59:31
date and time: 12/24/2018, 04:59:31
```

Here, `year`, `day`, `time` and `date_time` are strings, whereas `now` is a `datetime` object.

How strftime() works?

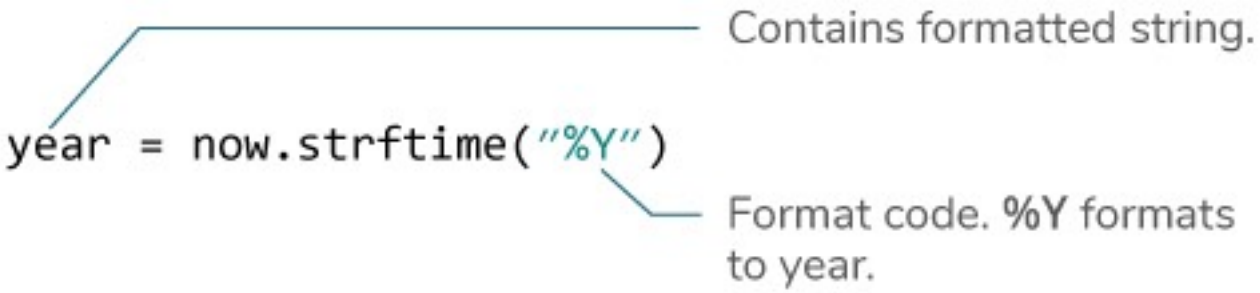
In the above program, `%Y`, `%m`, `%d` etc. are format codes. The `strftime()` method takes one or more format codes as an argument and returns a formatted string based on it.

1. We imported `datetime` class from the `datetime` module. It's because the object of `datetime` class can access `strftime()` method.



2. The `datetime` object containing current date and time is stored in `now` variable.

3. The `strftime()` method can be used to create formatted strings.



4. The string you pass to the `strftime()` method may contain more than one format codes.

```
date_time = now.strftime("%m/%d/%Y, %H:%M:%S")
```

12/24/2018, 04:59:31

Example 2: Creating string from a timestamp

```
from datetime import datetime

timestamp = 1528797322
date_time = datetime.fromtimestamp(timestamp)

print("Date time object:", date_time)

d = date_time.strftime("%m/%d/%Y, %H:%M:%S")
print("Output 2:", d)

d = date_time.strftime("%d %b, %Y")
print("Output 3:", d)

d = date_time.strftime("%d %B, %Y")
print("Output 4:", d)

d = date_time.strftime("%I%p")
print("Output 5:", d)
```

When you run the program, the output will be:

```
Date time object: 2018-06-12 09:55:22
Output 2: 06/12/2018, 09:55:22
Output 3: 12 Jun, 2018
Output 4: 12 June, 2018
Output 5: 09AM
```

Format Code List

The table below shows all the codes that you can pass to the `strftime()` method.

Directive	Meaning	Example
%a	Abbreviated weekday name.	Sun, Mon, ...
%A	Full weekday name.	Sunday, Monday, ...
%w	Weekday as a decimal number.	0, 1, ..., 6
%d	Day of the month as a zero-padded decimal.	01, 02, ..., 31
%-d	Day of the month as a decimal number.	1, 2, ..., 30
%b	Abbreviated month name.	Jan, Feb, ..., Dec
%B	Full month name.	January, February, ...
%m	Month as a zero-padded decimal number.	01, 02, ..., 12
%-m	Month as a decimal number.	1, 2, ..., 12
%y	Year without century as a zero-padded decimal number.	00, 01, ..., 99

`%-y`	Year without century as a decimal number.	0, 1, ..., 99
`%Y`	Year with century as a decimal number.	2013, 2019 etc.
`%H`	Hour (24-hour clock) as a zero-padded decimal number.	00, 01, ..., 23
`%-H`	Hour (24-hour clock) as a decimal number.	0, 1, ..., 23
`%I`	Hour (12-hour clock) as a zero-padded decimal number.	01, 02, ..., 12
`%-I`	Hour (12-hour clock) as a decimal number.	1, 2, ... 12
`%p`	Locale's AM or PM.	AM, PM
`%M`	Minute as a zero-padded decimal number.	00, 01, ..., 59
`%-M`	Minute as a decimal number.	0, 1, ..., 59
`%S`	Second as a zero-padded decimal number.	00, 01, ..., 59
`%-S`	Second as a decimal number.	0, 1, ..., 59
`%f`	Microsecond as a decimal number, zero-padded on the left.	000000 - 999999
`%z`	UTC offset in the form +HHMM or -HHMM.	
`%Z`	Time zone name.	

%j	Day of the year as a zero-padded decimal number.	001, 002, ..., 366
%-j	Day of the year as a decimal number.	1, 2, ..., 366
%U	Week number of the year (Sunday as the first day of the week). All days in a new year preceding the first Sunday are considered to be in week 0.	00, 01, ..., 53
%W	Week number of the year (Monday as the first day of the week). All days in a new year preceding the first Monday are considered to be in week 0.	00, 01, ..., 53
%c	Locale's appropriate date and time representation.	Mon Sep 30 07:06:05 2013
%x	Locale's appropriate date representation.	09/30/13
%X	Locale's appropriate time representation.	07:06:05
%%	A literal '%' character.	%

Example 3: Locale's appropriate date and time

```
from datetime import datetime
```

```
timestamp = 1528797322
date_time = datetime.fromtimestamp(timestamp)

d = date_time.strftime("%c")
print("Output 1:", d)

d = date_time.strftime("%x")
print("Output 2:", d)

d = date_time.strftime("%X")
print("Output 3:", d)
```

When you run the program, the output will be:

```
Output 1: Tue Jun 12 09:55:22 2018
Output 2: 06/12/18
Output 3: 09:55:22
```

Format codes `%c`, `%x` and `%X` are used for locale's appropriate date and time representation.

Python strptime()

In this article, you will learn to create a datetime object from a string (with the help of examples).

The `strptime()` method creates a datetime object from the given string.

Note: You cannot create `datetime` object from every string. The string needs to be in a certain format.

Example 1: string to datetime object

```
from datetime import datetime

date_string = "21 June, 2018"

print("date_string =", date_string)
print("type of date_string =", type(date_string))

date_object = datetime.strptime(date_string, "%d %B, %Y")

print("date_object =", date_object)
print("type of date_object =", type(date_object))
```

When you run the program, the output will be:

```
date_string = 21 June, 2018
type of date_string = <class 'str'>
date_object = 2018-06-21 00:00:00
type of date_object = <class 'datetime.datetime'>
```

How strptime() works?

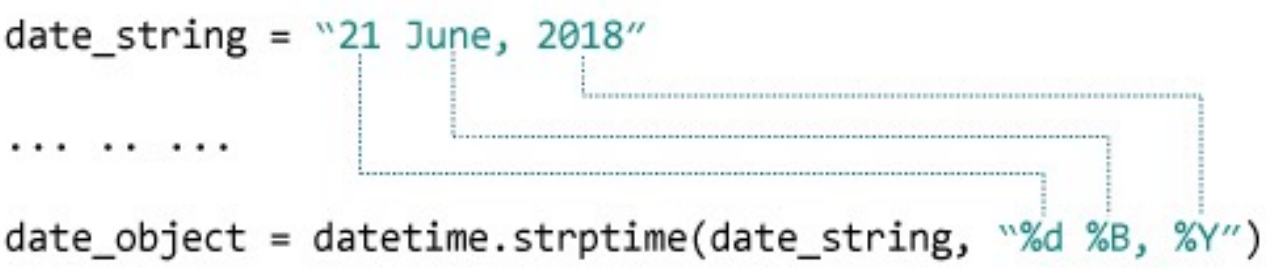
The `strptime()` class method takes two arguments:

- string (that be converted to datetime)

- format code

Based on the string and format code used, the method returns its equivalent `datetime` object.

In the above example:



Here,

- `%d` - Represents the day of the month. **Example:** 01, 02, ..., 31
- `%B` - Month's name in full. **Example:** January, February etc.
- `%Y` - Year in four digits. **Example:** 2018, 2019 etc.

Example 2: string to datetime object

```
from datetime import datetime

dt_string = "12/11/2018 09:15:32"

# Considering date is in dd/mm/yyyy format
dt_object1 = datetime.strptime(dt_string, "%d/%m/%Y %H:%M:%S")
print("dt_object1 =", dt_object1)

# Considering date is in mm/dd/yyyy format
dt_object2 = datetime.strptime(dt_string, "%m/%d/%Y %H:%M:%S")
print("dt_object2 =", dt_object2)
```

When you run the program, the output will be:

```
dt_object1 = 2018-11-12 09:15:32
dt_object2 = 2018-12-11 09:15:32
```

Format Code List

The table below shows all the format codes that you can use.

Directive	Meaning	Example
%a	Abbreviated weekday name.	Sun, Mon, ...
%A	Full weekday name.	Sunday, Monday, ...
%w	Weekday as a decimal number.	0, 1, ..., 6

`%d`	Day of the month as a zero-padded decimal.	01, 02, ..., 31
`%-d`	Day of the month as a decimal number.	1, 2, ..., 30
`%b`	Abbreviated month name.	Jan, Feb, ..., Dec
`%B`	Full month name.	January, February, ...
`%m`	Month as a zero-padded decimal number.	01, 02, ..., 12
`%-m`	Month as a decimal number.	1, 2, ..., 12
`%y`	Year without century as a zero-padded decimal number.	00, 01, ..., 99
`%-y`	Year without century as a decimal number.	0, 1, ..., 99
`%Y`	Year with century as a decimal number.	2013, 2019 etc.
`%H`	Hour (24-hour clock) as a zero-padded decimal number.	00, 01, ..., 23
`%-H`	Hour (24-hour clock) as a decimal number.	0, 1, ..., 23
`%I`	Hour (12-hour clock) as a zero-padded decimal number.	01, 02, ..., 12
`%-I`	Hour (12-hour clock) as a decimal number.	1, 2, ... 12
`%p`	Locale’s AM or PM.	AM, PM

`%M`	Minute as a zero-padded decimal number.	00, 01, ..., 59
`%-M`	Minute as a decimal number.	0, 1, ..., 59
`%S`	Second as a zero-padded decimal number.	00, 01, ..., 59
`%-S`	Second as a decimal number.	0, 1, ..., 59
`%f`	Microsecond as a decimal number, zero-padded on the left.	000000 - 999999
`%z`	UTC offset in the form +HHMM or -HHMM.	
`%Z`	Time zone name.	
`%j`	Day of the year as a zero-padded decimal number.	001, 002, ..., 366
`%-j`	Day of the year as a decimal number.	1, 2, ..., 366
`%U`	Week number of the year (Sunday as the first day of the week). All days in a new year preceding the first Sunday are considered to be in week 0.	00, 01, ..., 53
`%W`	Week number of the year (Monday as the first day of the week). All days in a new year preceding the first Monday are considered to be in week 0.	00, 01, ..., 53
`%c`	Locale's appropriate date and time representation.	Mon Sep 30 07:06:05 2013

%x	Locale's appropriate date representation.	09/30/13
%X	Locale's appropriate time representation.	07:06:05
%%	A literal '%' character.	%

ValueError in strptime()

If the string (first argument) and the format code (second argument) passed to the `strptime()` doesn't match, you will get `ValueError`. For example:

```
from datetime import datetime

date_string = "12/11/2018"
date_object = datetime.strptime(date_string, "%d %m %Y")

print("date_object =", date_object)
```

If you run this program, you will get an error.

```
ValueError: time data '12/11/2018' does not match format
'%d %m %Y'
```