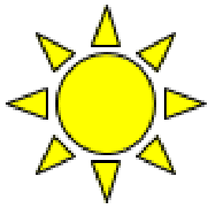
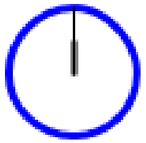
UTC offsets

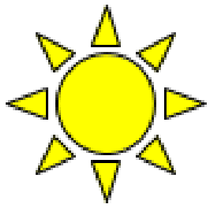
WORKING WITH DATES AND TIMES IN PYTHON

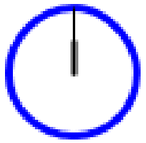
Max Shron
Data Scientist and Author

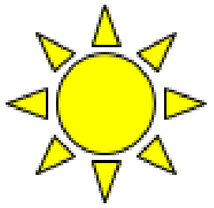
datacamp

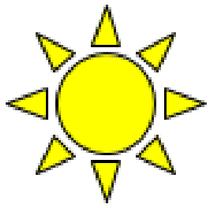


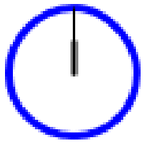


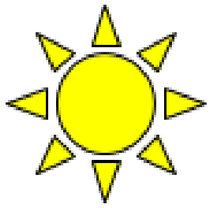


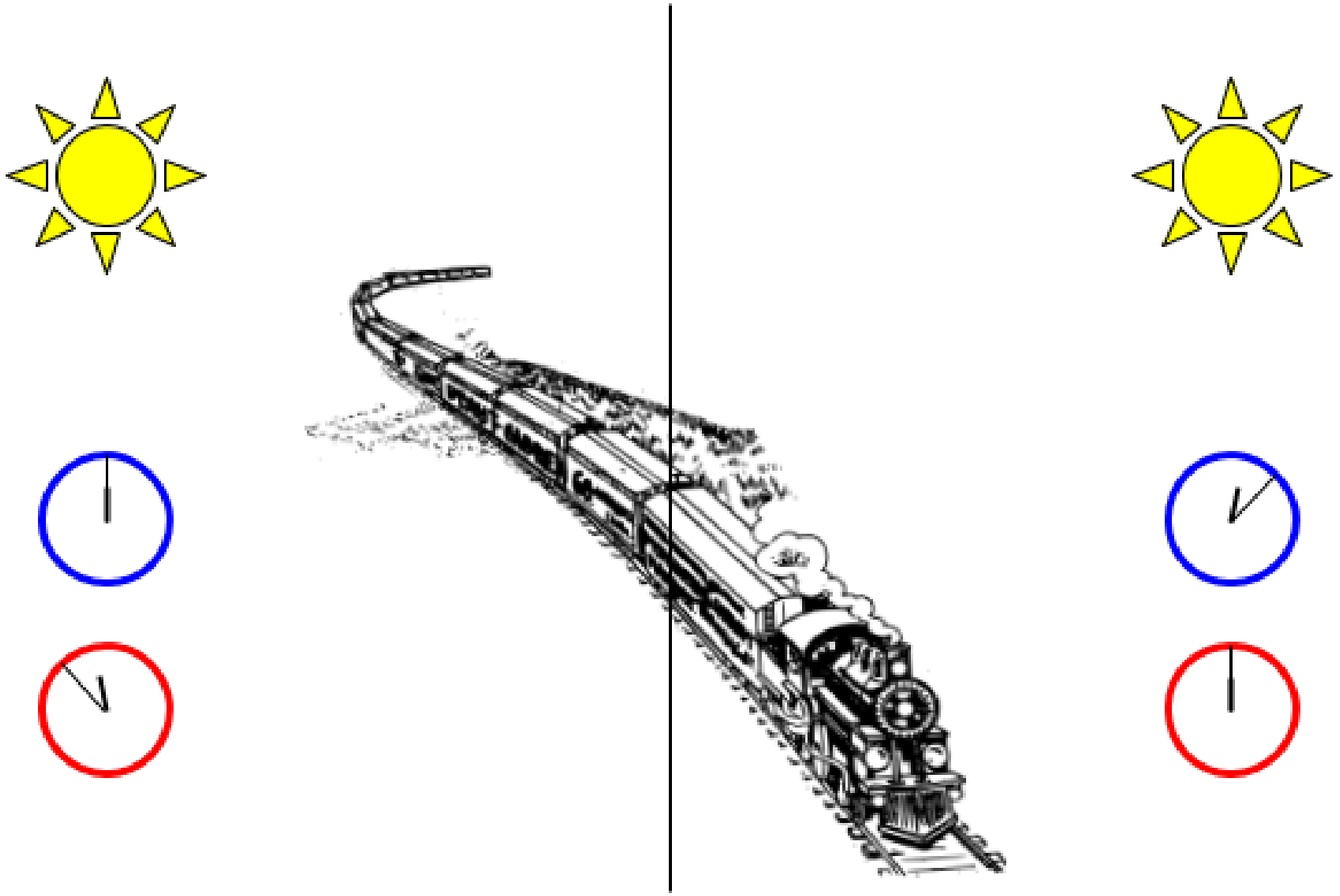




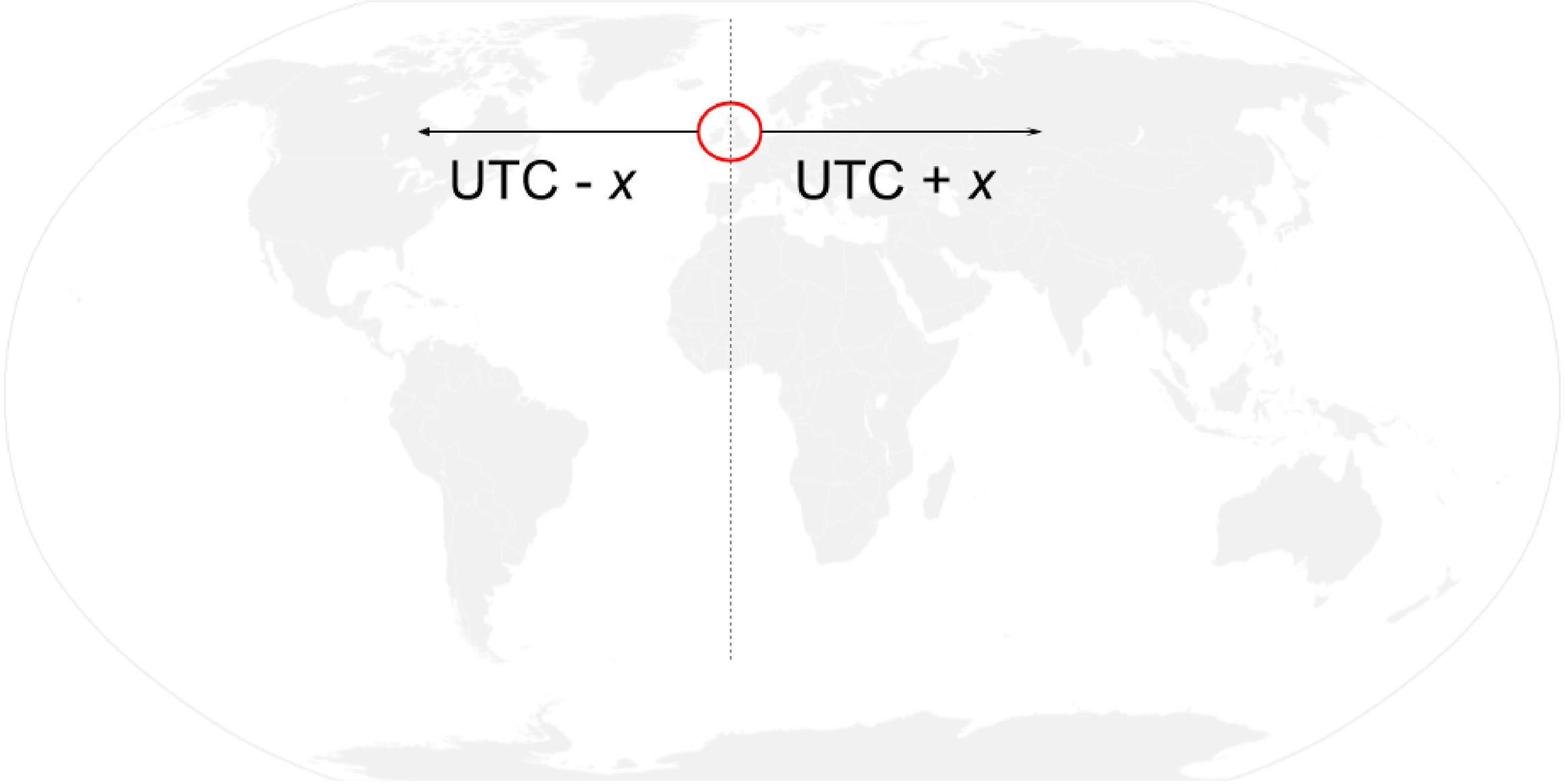








CANADA
SEATTLE
PORTLAND
PACIFIC
3 PM
MOUNTAIN
4 PM
CENTRAL
5 PM
EASTERN
6 PM
SAN FRANCISCO
LAS VEGAS
LOS ANGELES
PHOENIX
SALT LAKE CITY
DENVER
EL PASO
MINNEAPOLIS
CHICAGO
DETROIT
OKLAHOMA CITY
DALLAS
MEMPHIS
LOUISVILLE
ATLANTA
WASHINGTON
NEW YORK
BOSTON
PACIFIC OCEAN
ATLANTIC OCEAN


UTC - x
UTC + x

UTC

```
# Import relevant classes
from datetime import datetime, timedelta, timezone
```

UTC

```
# Import relevant classes
from datetime import datetime, timedelta, timezone

# US Eastern Standard time zone
ET = timezone(timedelta(hours=-5))
# Timezone-aware datetime
dt = datetime(2017, 12, 30, 15, 9, 3, tzinfo = ET)
```

```
print(dt)
```

```
2017-12-30 15:09:03-05:00
```

UTC

```
# India Standard time zone
IST = timezone(timedelta(hours=5, minutes=30))
# Convert to IST
print(dt.astimezone(IST))
```

```
2017-12-31 01:39:03+05:30
```

Adjusting timezone vs changing tzinfo

```
print(dt)
```

```
2017-12-30 15:09:03-05:00
```

```
print(dt.replace(tzinfo=timezone.utc))
```

```
2017-12-30 15:09:03+00:00
```

```
# Change original to match UTC
print(dt.astimezone(timezone.utc))
```

```
2017-12-30 20:09:03+00:00
```

UTC Offsets

WORKING WITH DATES AND TIMES IN PYTHON

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Time zone database

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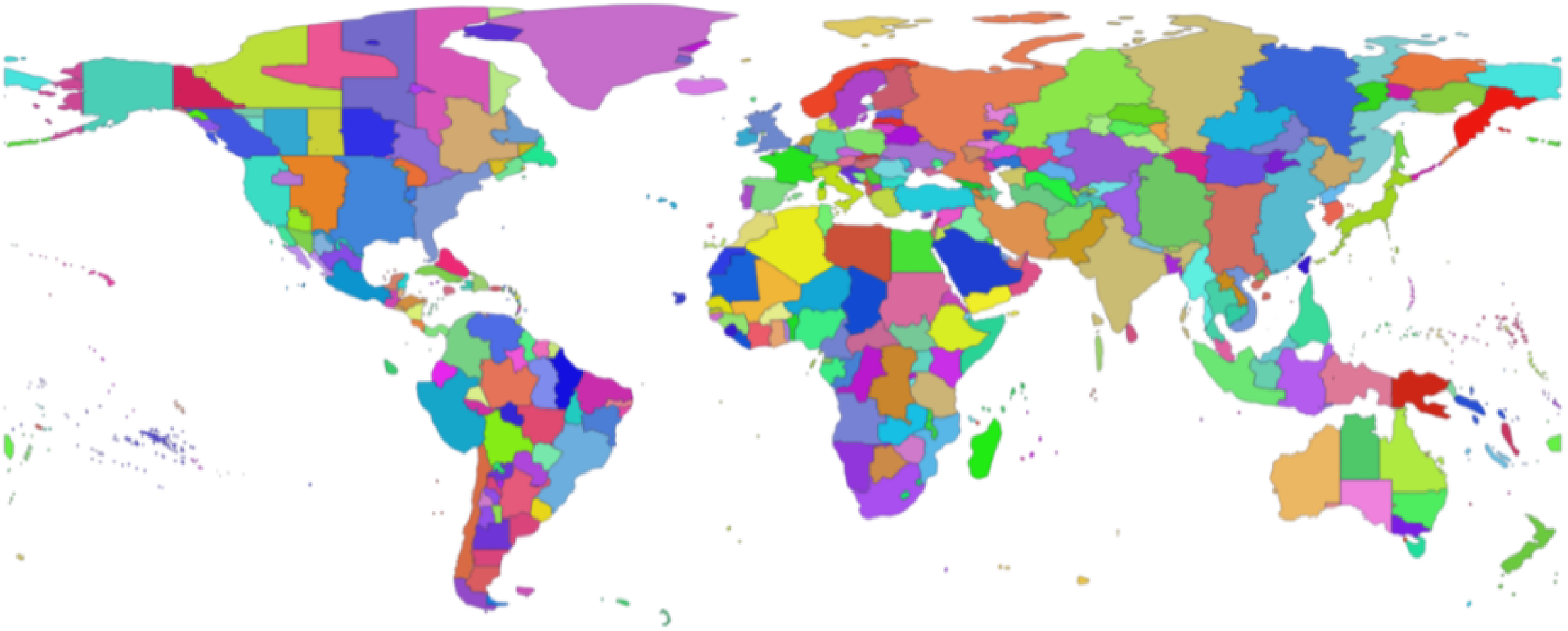

Time zone database

```
# Imports
from datetime import datetime
from dateutil import tz
```

tz database

Time zone database

```
# Imports
from datetime import datetime
from dateutil import tz

# Eastern time
et = tz.gettz('America/New_York')
```

tz database

- Format: 'Continent/City'

Time zone database

```
# Imports
from datetime import datetime
from dateutil import tz

# Eastern time
et = tz.gettz('America/New_York')
```

tz database

- Format: 'Continent/City'
- Examples:
  - 'America/New_York'
  - 'America/Mexico_City'
  - 'Europe/London'
  - 'Africa/Accra'

Time zone database

```
# Last ride
last = datetime(2017, 12, 30, 15, 9, 3, tzinfo=et)
```

```
print(last)
```

```
2017-12-30 15:09:03-05:00
```

Time zone database

```
# Last ride
last = datetime(2017, 12, 30, 15, 9, 3, tzinfo=et)
print(last)
```

```
2017-12-30 15:09:03-05:00
```

```
# First ride
first = datetime(2017, 10, 1, 15, 23, 25, tzinfo=et)
print(first)
```

```
2017-10-01 15:23:25-04:00
```

Time zone database

WORKING WITH DATES AND TIMES IN PYTHON

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Starting Daylight Saving Time

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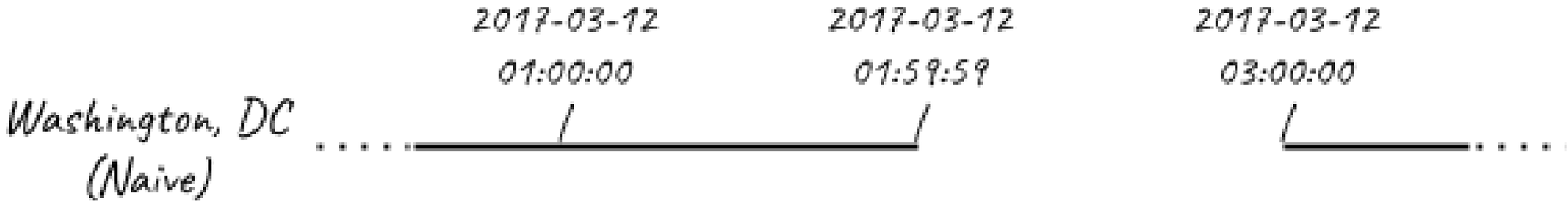
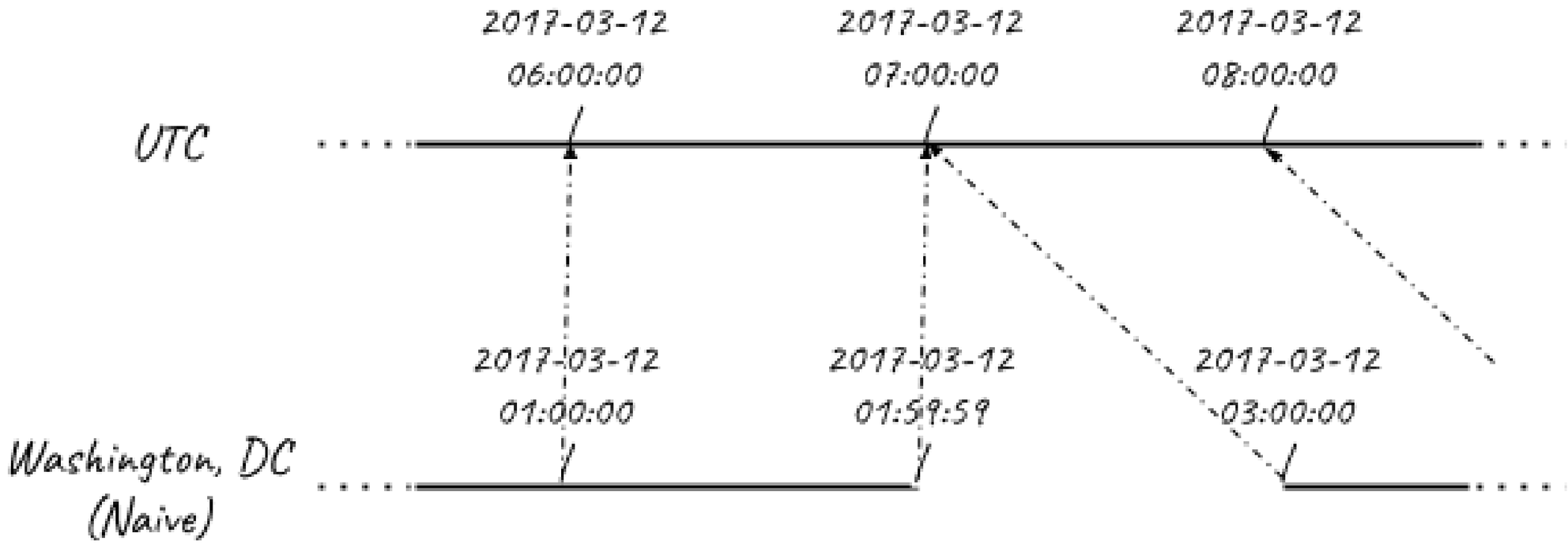

2017-03-12
01:00:00
2017-03-12
01:59:59
2017-03-12
03:00:00
Washington, DC
(Naive)


2017-03-12
06:00:00
2017-03-12
07:00:00
2017-03-12
08:00:00
UTC
2017-03-12
01:00:00
2017-03-12
01:59:59
2017-03-12
03:00:00
Washington, DC
(Naive)

Start of Daylight Saving Time

```
spring_ahead_159am = datetime(2017, 3, 12, 1, 59, 59)
spring_ahead_159am.isoformat()
```

```
'2017-03-12T01:59:59'
```

```
spring_ahead_3am = datetime(2017, 3, 12, 3, 0, 0)
spring_ahead_3am.isoformat()
```

```
'2017-03-12T03:00:00'
```

```
(spring_ahead_3am - spring_ahead_159am).total_seconds()
```

```
3601.0
```

Start of Daylight Saving Time

```
from datetime import timezone, timedelta

EST = timezone(timedelta(hours=-5))
EDT = timezone(timedelta(hours=-4))
```

Start of Daylight Saving Time

```
spring_ahead_159am = spring_ahead_159am.replace(tzinfo = EST)
spring_ahead_159am.isoformat()
```

```
'2017-03-12T01:59:59-05:00'
```

```
spring_ahead_3am = spring_ahead_3am.replace(tzinfo = EDT)
spring_ahead_3am.isoformat()
```

```
'2017-03-12T03:00:00-04:00'
```

```
(spring_ahead_3am - spring_ahead_159am).seconds
```

```
1
```

Start of Daylight Saving Time

Using `dateutil`

```
# Import tz
from dateutil import tz

# Create eastern timezone
eastern = tz.gettz('America/New_York')
# 2017-03-12 01:59:59 in Eastern Time (EST)
spring_ahead_159am = datetime(2017, 3, 12, 1, 59, 59,
                              tzinfo = eastern)

# 2017-03-12 03:00:00 in Eastern Time (EDT)
spring_ahead_3am = datetime(2017, 3, 12, 3, 0, 0,
                            tzinfo = eastern)
```

Daylight Saving

WORKING WITH DATES AND TIMES IN PYTHON

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Ending Daylight Saving Time

WORKING WITH DATES AND TIMES IN PYTHON

Max Shron
Data Scientist and Author

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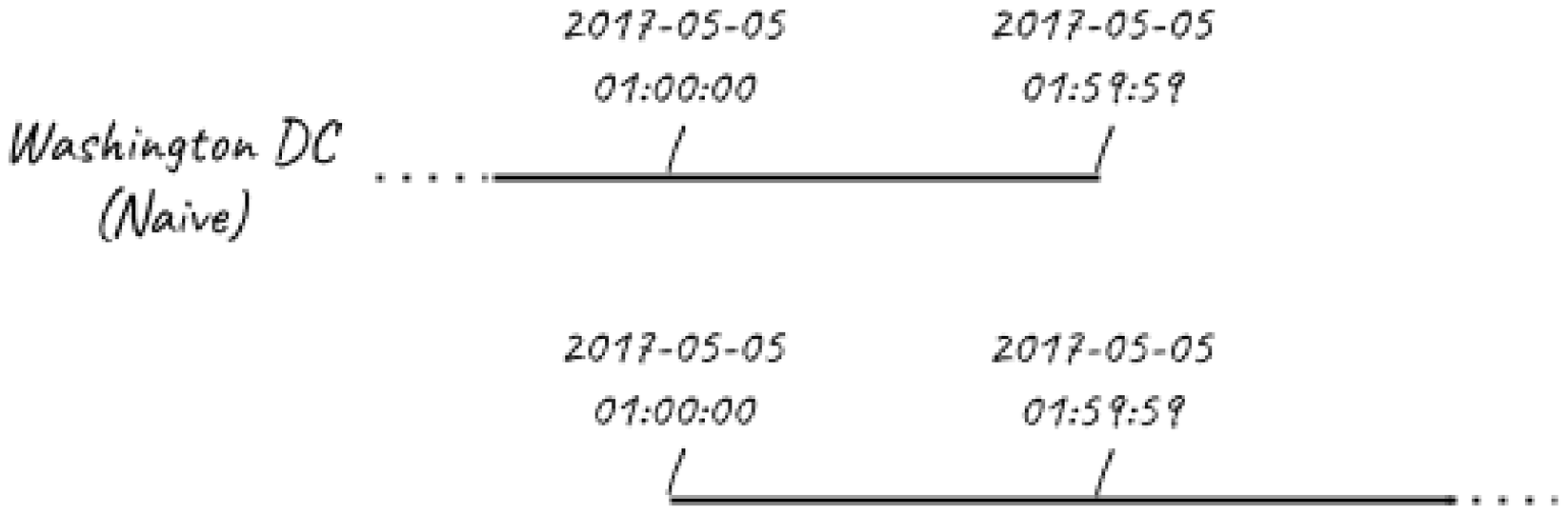
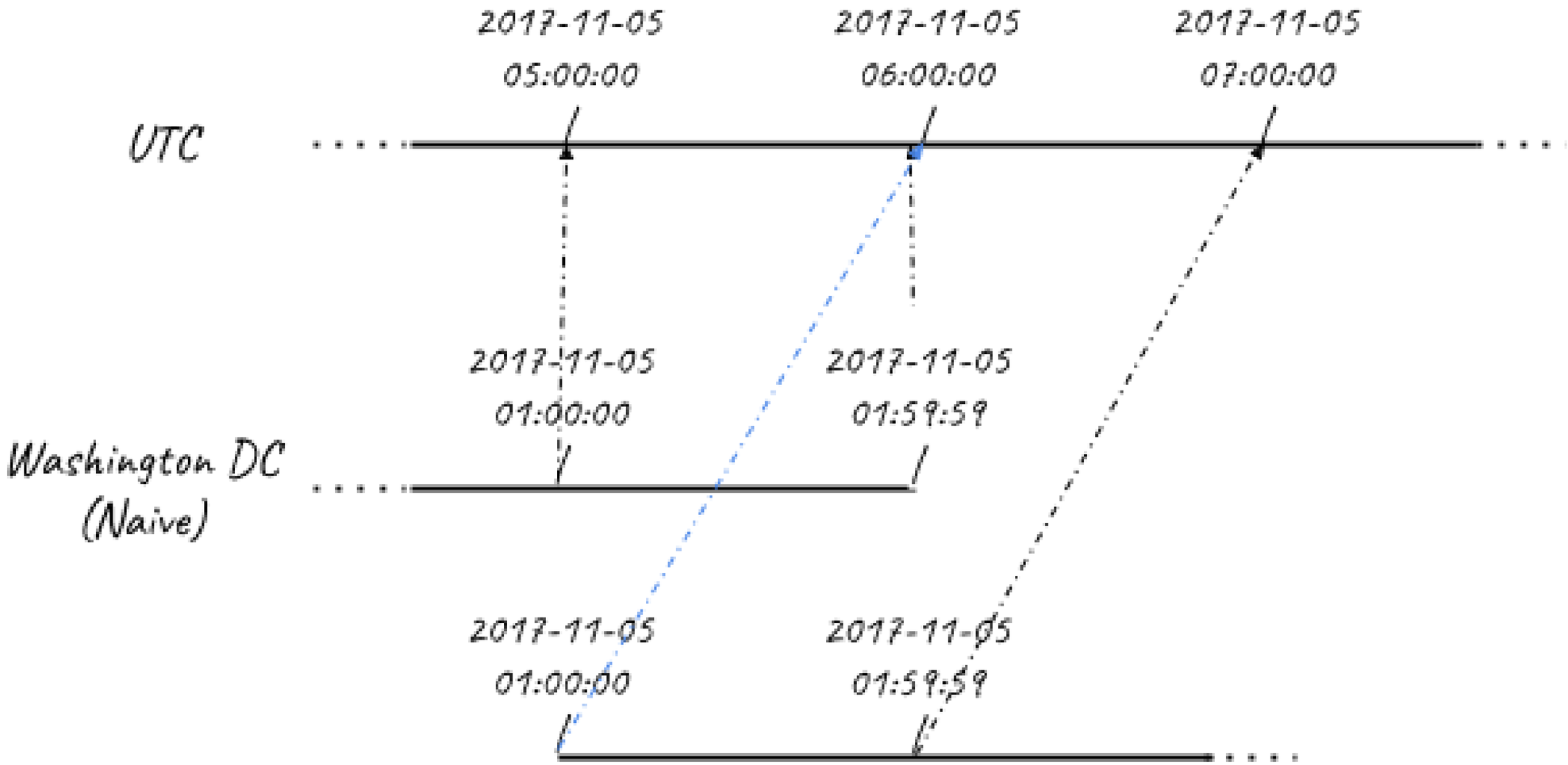

2017-05-05
01:00:00
2017-05-05
01:59:59
Washington DC
(Naive)
2017-05-05
01:00:00
2017-05-05
01:59:59


2017-11-05
05:00:00
2017-11-05
06:00:00
2017-11-05
07:00:00
UTC
2017-11-05
01:00:00
2017-11-05
01:59:59
Washington DC
(Naive)
2017-11-05
01:00:00
2017-11-05
01:59:59

Ending Daylight Saving Time

```
eastern = tz.gettz('US/Eastern')
# 2017-11-05 01:00:00
first_1am = datetime(2017, 11, 5, 1, 0, 0,
                     tzinfo = eastern)
tz.datetime_ambiguous(first_1am)
```

```
True
```

```
# 2017-11-05 01:00:00 again
second_1am = datetime(2017, 11, 5, 1, 0, 0,
                      tzinfo = eastern)
second_1am = tz.enfold(second_1am)
```

Ending Daylight Saving Time

```
(first_1am - second_1am).total_seconds()
```

```
0.0
```

```
first_1am = first_1am.astimezone(tz.UTC)
second_1am = second_1am.astimezone(tz.UTC)
(second_1am - first_1am).total_seconds()
```

```
3600.0
```

Ending Daylight Saving Time

WORKING WITH DATES AND TIMES IN PYTHON

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