NTP Client

Graded

Group

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Total Points

100 / 100 pts

Autograder Score

100.0 / 100.0

Passed Tests

Parse Packets (40/40)
Obtain packet from apple (20/20)
Obtain packet from cloudflare (20/20)
get current time (20/20)

Autograder Results

Parse Packets (40/40)

Obtain packet from apple (20/20)

Obtain packet from cloudflare (20/20)

get current time (20/20)

Submitted Files

ntpclient.py

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```python
#!/usr/bin/env python
'''
CS352 Assignment 1: Network Time Protocol
You can work with 1 other CS352 student
DO NOT CHANGE ANY OF THE FUNCTION SIGNATURES BELOW
'''
from socket import socket, AF_INET, SOCK_DGRAM
import struct
from datetime import datetime

def getNTPTimeValue(server="time.apple.com", port=123) -> (bytes, float, float):
# add your code here

    pkt = struct.pack("!3Bb3I4Q",0b00011011,0,0,0,0,0,0,0,0,0)

    time_difference = datetime.utcnow() - datetime(1970, 1, 1, 0, 0, 0)
    secs = time_difference.days*24.0*60.0*60.0 + time_difference.seconds
    T1 = secs + float(time_difference.microseconds / 1000000.0)

    client_socket = socket(AF_INET, SOCK_DGRAM)
    client_socket.sendto(pkt, (server, port))

    pkt, (server, port) = client_socket.recvfrom(48)

    time_difference = datetime.utcnow() - datetime(1970, 1, 1, 0, 0, 0)
    secs = time_difference.days*24.0*60.0*60.0 + time_difference.seconds
    T4 = secs + float(time_difference.microseconds / 1000000.0)

    client_socket.close()

    return (pkt, T1, T4)

def ntpPktToRTTandOffset(pkt: bytes, T1: float, T4: float) -> (float, float):
# add your code here
    received = struct.unpack("!Q", pkt[32:40])[0]
    transmitted = struct.unpack("!Q", pkt[40:48])[0]

    receivedFloat = (received >> 32) + (received & 0xFFFFFFFF) / (2**32)
    transmittedFloat = (transmitted >> 32) + (transmitted & 0xFFFFFFFF) / (2**32)

    T2 = receivedFloat - 2208988800 #time in seconds 1900 - 1970
    T3 = transmittedFloat - 2208988800

    #rtt
    rtt = (T4-T1) - (T3-T2)

```

```
    #offset
    offset = ((T2-T1) + (T3-T4)) / 2

    return (rtt, offset)

def getCurrentTime(server="time.apple.com", port=123, iters=20) -> float:
# add your code here
    offsets = []

    for _ in range(iters):
        pkt, T1, T4 = getNTPTimeValue(server, port)
        RTT, offset = ntpPktToRTTandOffset(pkt, T1, T4)
        offsets.append(offset)

    time_difference = datetime.utcnow() - datetime(1970, 1, 1, 0, 0, 0)
    secs = time_difference.days*24.0*60.0*60.0 + time_difference.seconds
    currentTime = secs + float(time_difference.microseconds / 1000000.0)
    currentTime += sum(offsets) / len(offsets)

    return currentTime

if __name__ == "__main__":
    print(getCurrentTime())
```