Participatory Learning Assignment

Lightbulb protocol

The client will perform the following functions:

1. Read in 6 arguments from the command line:
   1. IP address of server (127.0.0.1)
   2. Port of server (9000)
   3. 0, 1, or 2 to turn off, on, or ignore lightbulb state.
   4. **Three** values ranging from 1 – 255 or all 0’s to ignore color change. (0, 0, 0)
2. Send a request with the specified IP and port to the server using the message format specified.

a. If a response arrives within the timeout period, print out the server response as shown in

this document.

b. If not, re-send the message (same sequence number) for a maximum of 3 attempts before

printing an applicable message and exiting.

The server will perform the following functions:

1. Read in 2 arguments from the command line:
   1. IP address of server (127.0.0.1)
   2. Port of server (9000)
2. Store 4 integers: one for on/off status, 3 for the different color hues. (red, green, blue)
3. Respond to requests from the client using the message format specified.
4. Update stored values to client requested values.
5. Return an error whether the lightbulb will not turn on/off, or color cannot be changed using the message format specified.

Request/Response (2 bit): Send 1 on request; Receive 0 for success or 2 for error

Light bulb on/off (2 bit): Send 0 for off or 1 for on; 2 to ignore light switching; Receive 0 or 1 for current state Receive 3 for on/off error

Red Hue (8 bit): value from 1 to 255; Color range for red hue. Send 0 to ignore color change. Receive 0 for error otherwise the current color value of the lightbulb.

Green Hue (8 bit): value from 1 to 255; Color range for green hue. Send 0 to ignore color change. Receive 0 for error otherwise the current color value of the lightbulb.

Blue Hue (8 bit): value from 1 to 255; Color range for blue hue. Send 0 to ignore color change. Receive 0 for error otherwise the current color value of the lightbulb.

1. Test Case 1: Client Output Example (Changing on/off status successfully):

$ python3 pl-client.py 127.0.0.1 9000 1 0 0 0

Sending a request to 127.0.0.1, 9000 to turn on lightbulb:

Turning lightbulb on …

The lightbulb is on with color values: 1, 1, 1

2. Test Case 2: Client Output Example (Changing color status successfully)

$ python3 pl-client.py 127.0.0.1 9000 2 255 255 255

Sending a request to 127.0.0.1, 9000 to change lightbulb color:

Changing lightbulb color …

The lightbulb is on with color values: 255, 255, 255

3. Test Case 3: Client Output Example (Changing both on/off and color status successfully)

$ python3 pl-client.py 127.0.0.1 9000 1 8 68 26

Sending a request to 127.0.0.1, 9000 to turn on and change lightbulb color:

Turning on lightbulb …

Changing lightbulb color …

The lightbulb is on with color values: 8, 68, 26

4. Test Case 4: Client Output Example (Changing on/off status failed because already on/off)

$ python3 pl-client.py 127.0.0.1 9000 0 0 0 0

Sending a request to 127.0.0.1, 9000 to turn on and change lightbulb color:

Turning off lightbulb …

The lightbulb is already off

5. Test Case 5: Client Output Example (Changing color status failed because it is the same color)

$ python3 pl-client.py 127.0.0.1 9000 2 56 68 34

Sending a request to 127.0.0.1, 9000 to change lightbulb color:

The lightbulb already has the color values: 56, 68, 34

6. Test Case 6: Client Output Example (Changing color status failed because it is not on)

$ python3 pl-client.py 127.0.0.1 9000 2 185 54 13

Sending a request to 127.0.0.1, 9000 to change lightbulb color:

Changing lightbulb color …

The lightbulb is not on to change the color

7. Test Case 7: Client Output Example (Changing on/off and/or color status failed because software/ hardware error) $ python3 pl-client.py 127.0.0.1 9000 1 46 31 65

Sending a request to 127.0.0.1, 9000 to turn on and change lightbulb color:

Changing lightbulb color …

There was an error with your request. Check your network and lightbulb.

Client: turn on lightbulb and change color

0 2 4 12 20 28

01 01 01010101 10011001 01100101

Request (on)/off red hue(85) green hue(153) blue hue(101)

Server: Turned on lightbulb and changed color success

0 2 4 12 20 28

00 01 01010101 10011001 01100101

Response (on)/off red hue(85) green hue(153) blue hue(101)