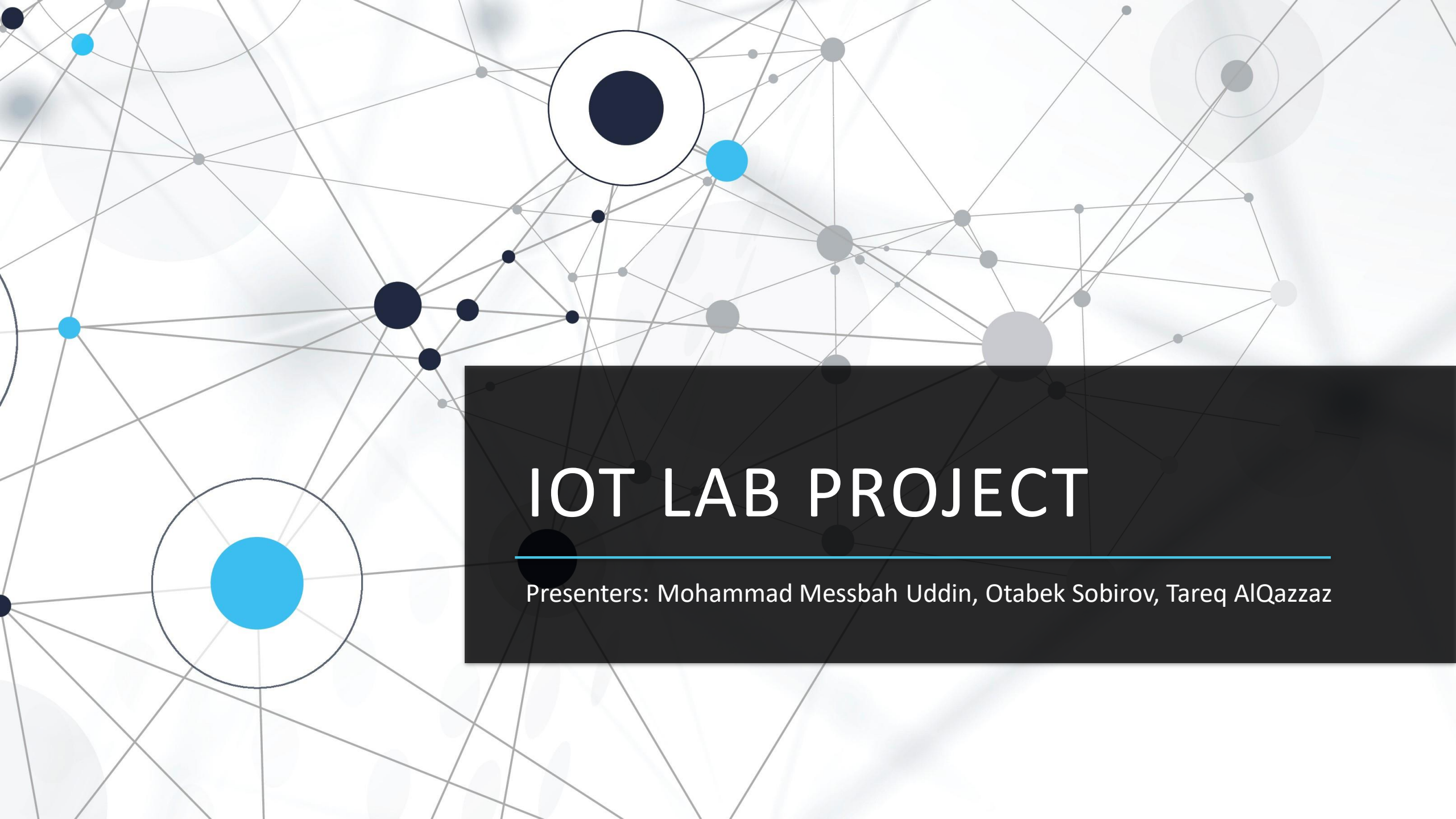


IOT LAB PROJECT

Presenters: Mohammad Messbah Uddin, Otabek Sobirov, Tareq AlQazzaz

CONTENT

THEORETICAL PART

PRACTICAL PART

USAGE

SETTING UP PREFERENCES

-5 : Y is strongly preferred over X.
-3 : Y is slightly preferred over X.
1 : X (Row) and Y (Column) are 1 equally preferred.
3 : X is slightly preferred over Y.
5 : X is strongly preferred over Y.

	Temperature	Humidity	CO_2	Noise	Light
Temperature	1	-5	-5	-5	-5
Humidity		1	-5	-5	-5
CO_2			1	-5	-5
Noise				1	-5
Light					1

Submit Clear

Calculating priority:

For each column:

calculate sum (k) of the elements (j) in that column.

divide j by k.

For each row:

calculate average of that row.

	Temp	Humidity	CO2	Noise	Light
Temp	1	3	3	5	5
Humidity	0.33	1	1	3	3
CO2	0.33	1	1	3	3
Noise	0.2	0.33	0.33	1	3
Light	0.2	0.33	0.33	0.33	1
Sum of columns	2.06	5.66	5.66	12.33	15

	Temp	Humidity	CO2	Noise	Light	Priority
Temp	0.48	0.53	0.53	0.41	0.33	0.456
Humidity	0.16	0.177	0.177	0.24	0.2	0.1908
CO2	0.16	0.177	0.177	0.24	0.2	0.1908
Noise	0.097	0.058	0.058	0.081	0.2	0.0988
Light	0.097	0.058	0.058	0.027	0.067	0.0614
	2.06	5.66	5.66	12.33	15	¬1

1. G=100, Y=50, R=0 (Green, Yellow, Red)
2. Read sensors' value and assign G/Y/R according to the set ranges to the sensors.
3. Priority=[0.456, 0.1908, 0.1908, 0.0988, 0.0614] (From the above table)
4. Sensor_val=[G,G,Y,R,G] (An example)
5. FOR Sensors in Room:
   Cosiness+= $\text{Priority}_i * \text{Sensor\_val}_i$
6. IF Cosiness >= 70: Cosy
   ELIF Cosiness >= 40 AND Cosiness < 70: Somewhat Cosy
   Else : Not Cosy

EXAMPLES:

Scenario 1:

Temp = Green , Humidity = Yellow, CO2 = Green , Noise = Yellow, Sound= Green

0.456*100 + 0.1908* 50 + 0.1908* 100 + 0.0988* 50 + 0.0614* 100

=85.304

Scenario 2:

Temp = Green , Humidity = Red, CO2 = Green , Noise = Red, Sound= Yellow

0.456*100+0.1908*0+0.1908*100+0.098*0+0.0614*50

=67.75

Scenario 3:

Temp = Red , Humidity = Yellow, CO2 = Yellow , Noise = Green, Sound= Green

0.456*0+0.1908*50+0.1908*50+0.098*100+0.0614*100

=35.02

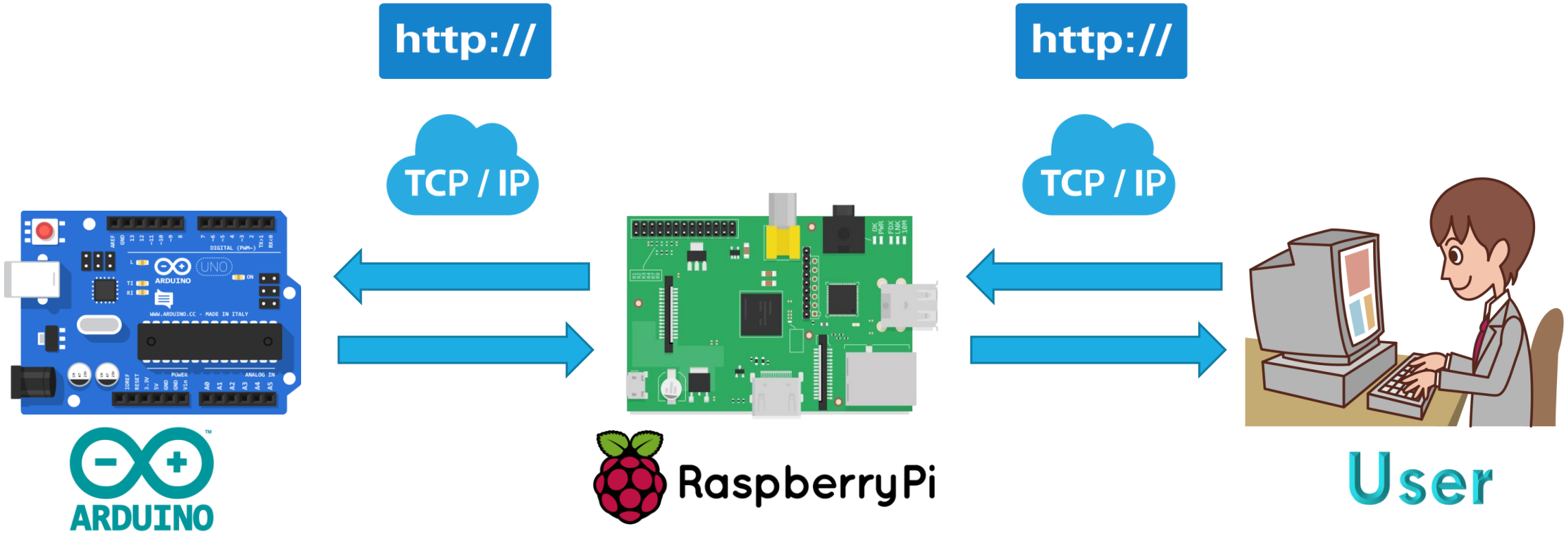
CONTENT

THEORETICAL PART

PRACTICAL PART

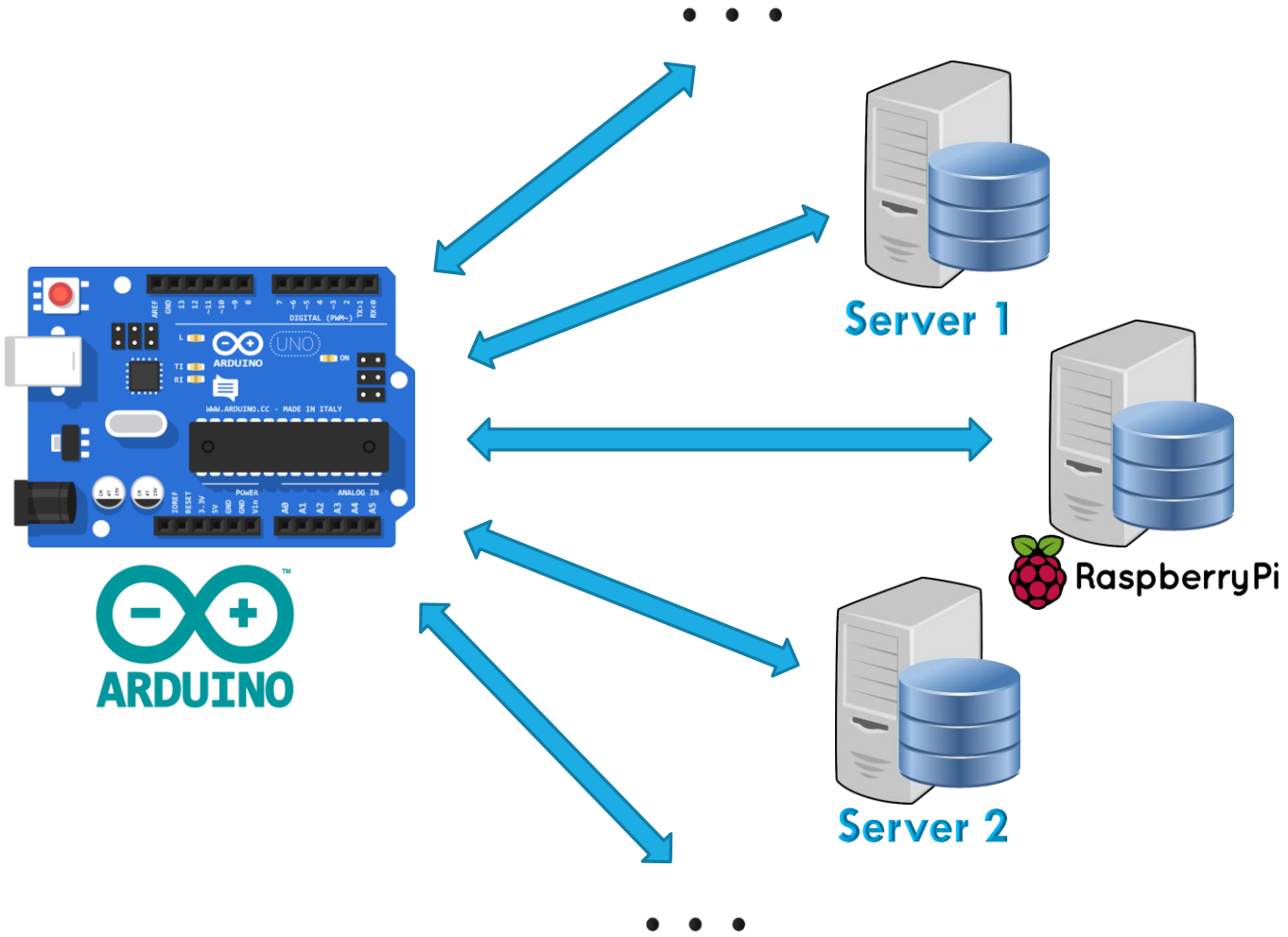
USAGE

ARCHITECTURE OF THE SYSTEM



ARDUINO (DEVICES LEVEL)

- TCP Server Communication
- Reading Sensor Values
- Secure & Reliable Communication
- Dynamic connectivity
- HTTP efficient usage



RASPBERRY PI (DATABASE)

Why SQLite DB

- Easy to use for the development purposes
- Lite and more compatible
- Supports Relational DataBase
- Uses less memory and CPU power
- Run nearly everywhere

RASPBERRY PI (WEB SERVER)

Why Python and Flask

- Python: studied in the class, useful for fast development
- Flask: Light-weight/micro framework
- Communication with DataBase
- Little dependency to update
- Can work on almost all platforms
- Useful for Development purposes

COMMUNICATION (HTTP/TCP)

Why HTTP/TCP

- Arduino/RaspberryPi – TCP communication
- Secure, Reliable, More Server, Unique API format on Arduino (HTTP without additional data)
- Our model is more of a Client-Sever model, not Device to Device Model
- HTTP can provide all the CRUD methods
- User-friendly interface with HTTP
- Compatible with all types of user

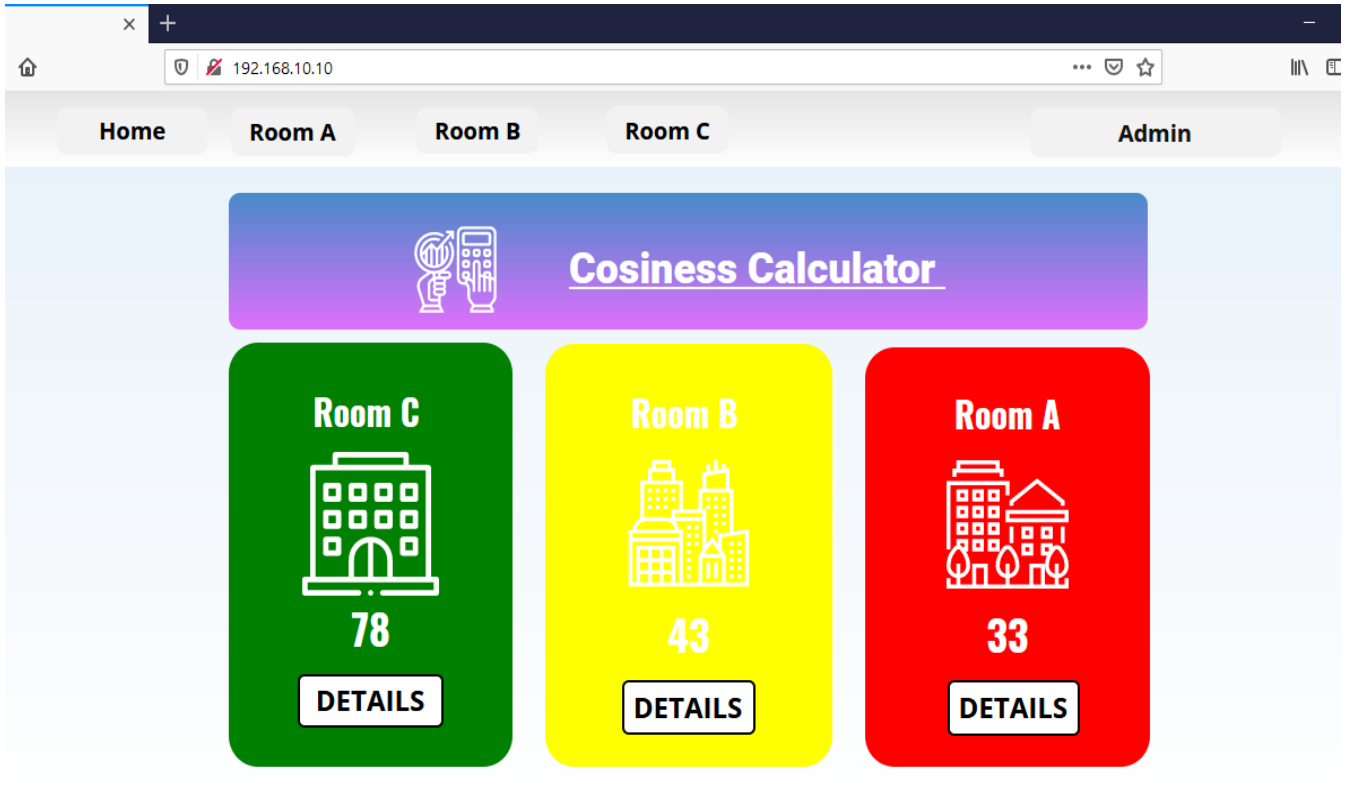
CONTENT

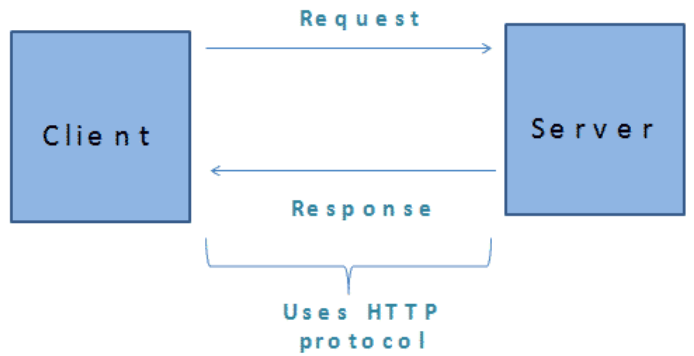
THEORETICAL PART

PRACTICAL PART

USAGE

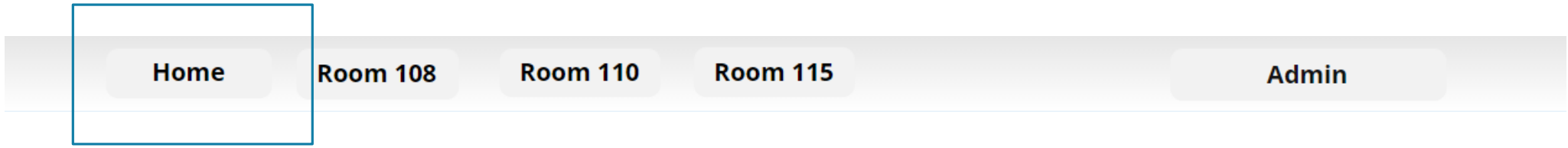
MAIN PAGE

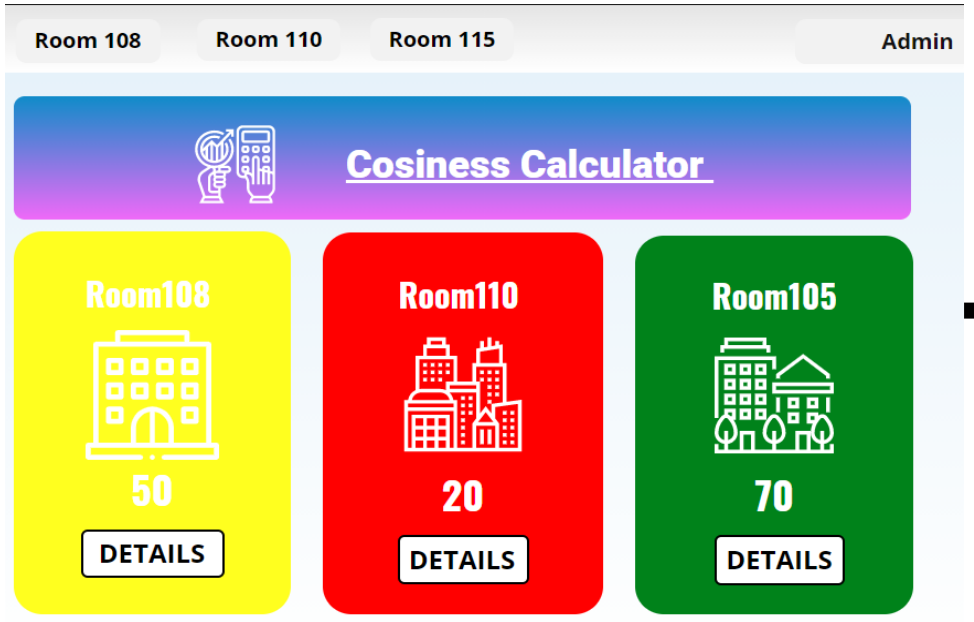

192.168.10.10
Home
Room A
Room B
Room C
Admin
Cosiness Calculator
Room C
78
DETAILS
Room B
43
DETAILS
Room A
33
DETAILS


Request
Client
Server
Response
Uses HTTP protocol


jQuery
CSS
HTML
JS

GET / RESPONSE

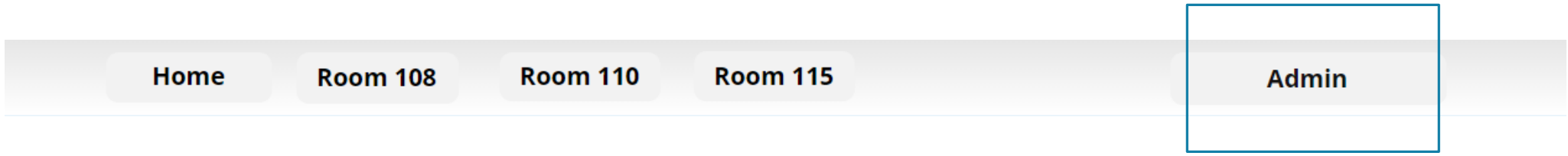


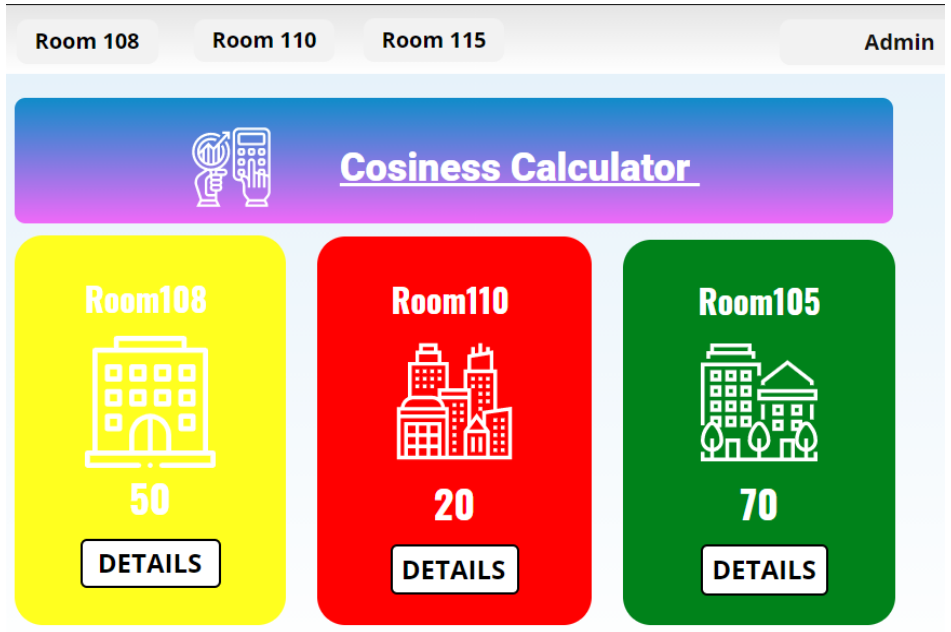


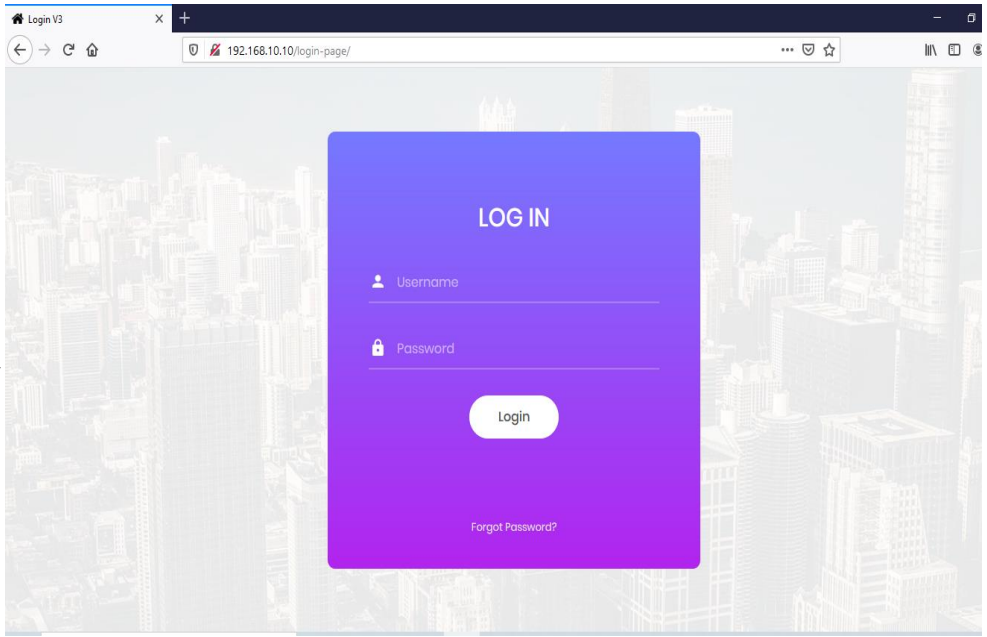

```python
@app.route("/login-page/", methods=["GET"])
def login_page_forwarding():
    return render_template('login-page.html')
```

```python
return render_template('Individual-Room.html', **selected_room)
```

ADMIN

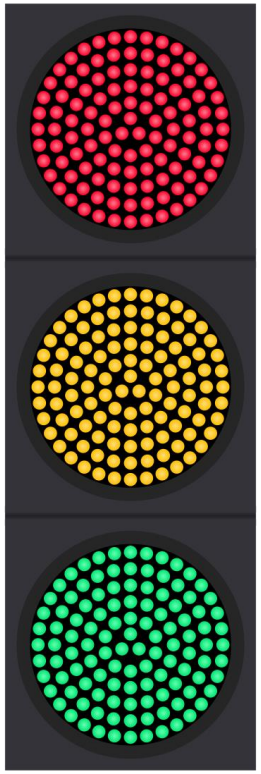






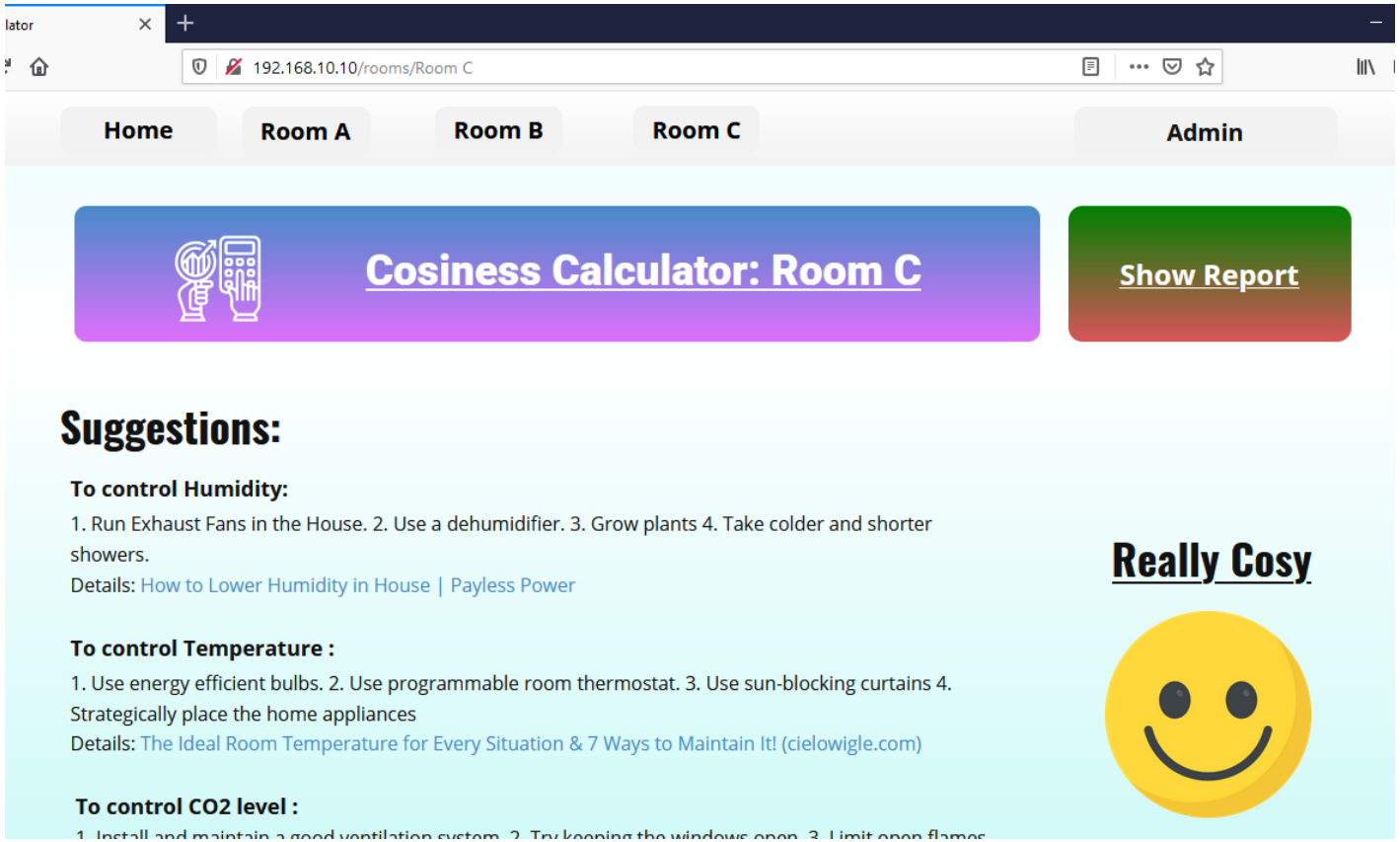

```
if login == ADMIN_EMAIL and password == ADMIN_PASS:
    return render_template('admin.html')
```

AHP COLORING SYSTEM

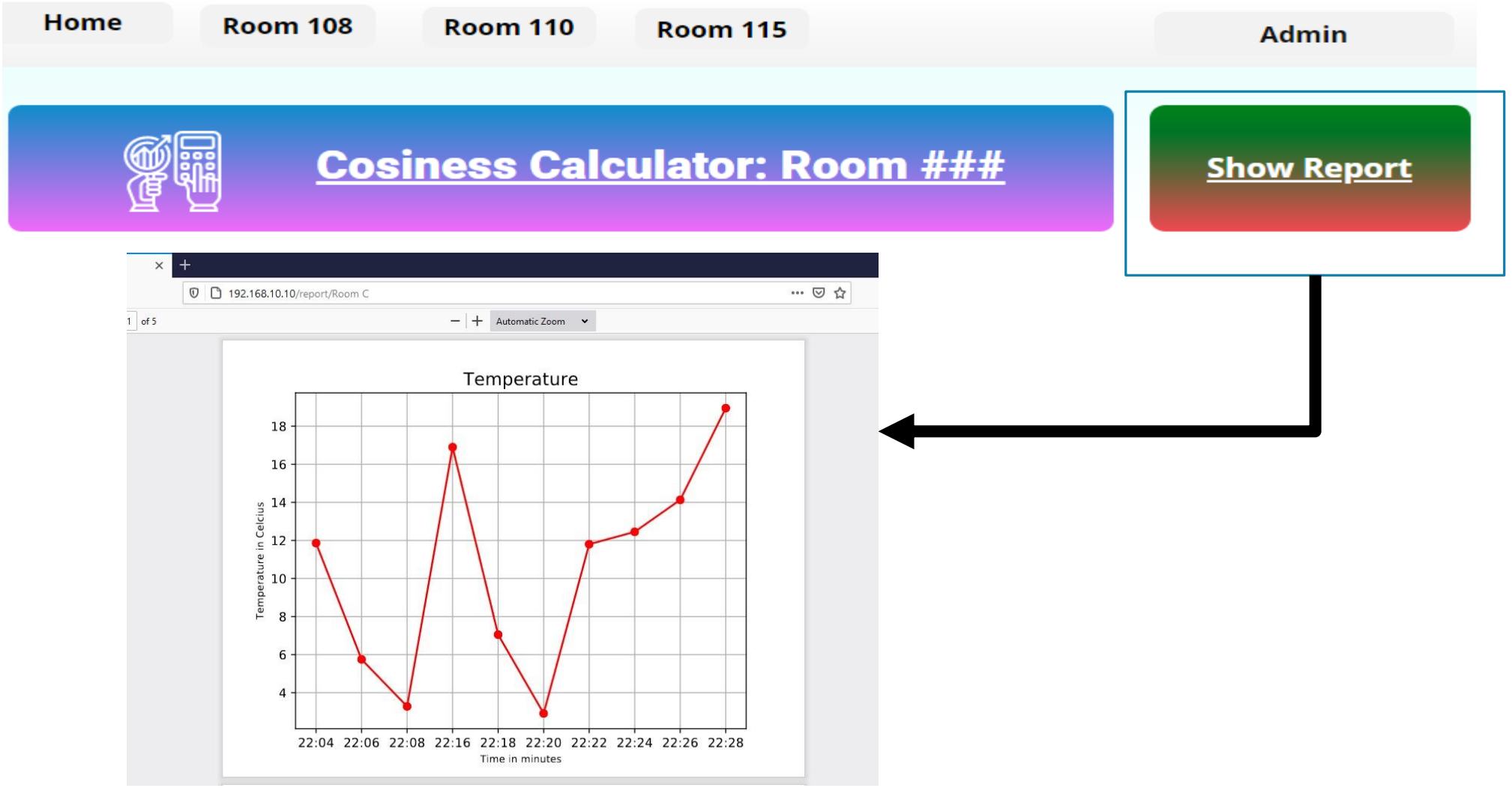


AHP Range Value	Color	is Cozy
0-39	RED	Not Cozy
40-69	YELLOW	Somehow Cozy
70-100	GREEN	Cozy

REPORT / SUGGESTIONS / VALUES



COZINESS CALCULATION PAGE



COZINES PARAMETER CALCULATION

.

Temperature

Ranges	**Color -Coziness**
16 – 22	Green - Cozy
13 – 15 || 23 – 26	Yellow – Somehow Cozy
Other	Red - Not Cozy

Sound

Ranges	**Color -Coziness**
0 - 600	Green - Cozy
600 - 800	Yellow – Somehow Cozy
Other	Red - Not Cozy

COSINES PARAMETER CALCULATION

.

Light

Ranges	Color -Coziness
200 – 500	Green - Cozy
20 – 200 || 500 - 100	Yellow – Somehow Cozy
Other	Red - Not Cozy

Humidity

Ranges	Color -Coziness
30 – 60	Green - Cozy
25 – 30 || 60 - 70	Yellow – Somehow Cozy
Other	Red - Not Cozy

COSINES PARAMETER CALCULATION

Co2

Ranges	Color -Coziness
0 – 800	Green - Cozy
800 - 2000	Yellow – Somehow Cozy
Other	Red - Not Cozy

References

Tempreture
Humidity
Co2
Light

noise level is set at db