Test case explanation:

We use a similar test case in Lab 1. For simplicity, we remove the query temperature part. Test case is shown below.

Time	Temperature	Motion	door	beacon	Gateway	User
0	Register	Register	Register	Register		Register
1	0	0	0	1		
2	1	1	0	1		
2.5	1	0	1	1		
3	1	0	0	0	Q(Motion)	
3.1	1	0	1	0		
3.3	0	1	0	0		
5	-1	0	0	0		
6	2	0	0	0		
6.3	0	0	1	1		
7	1	1	0	1		
8	2	0	0	1	Q(Motion)	
9	3	0	0	1		
10	3	0	0	1		
11	1	0	0	1	Q(Motion)	
12	1	0	0	1		
13	1	0	0	1		
14	2	0	0	1		
15	2	0	0	1	Q(Motion)	
16	3	0	0	1		
17	4	0	0	1		

Intuitively, this test case simulates the user leaves home at 2.5 and some one breaks in at 3.3. Then user come back at 7 and leave the room after 8.

Test case results:

The results are shown as follow. We can see that gate way successfully detects the intruder at 3.3 and turn on light for user at 7. After the use left for more than 5s, it turn off the light.

Time	Tempe	Motion	door	beacon	Gateway	User	ServerOutput	UserOutput	Bulb
0	Registe	Register	Register	Register		Regist	0.5:0;0		
1	0	0	0	1					
2	1	1	0	1			2.02:0;1		1
2.5	1	0	1	1			2.52:0;0		
3	1	0	0	0	Q(Motion)		3.03:0;0		
3.1	1	0	1	0					
3.3	0	1	0	0			3.33:0;1	Someone in your	
5	-1	0	0	0			5.02:0;0		
6	2	0	0	0					
6.3	0	0	1	1					
7	1	1	0	1			7.02:0;1		1
8	2	0	0	1	Q(Motion)		8.02:0;0		
9	3	0	0	1					
10	3	0	0	1					
11	1	0	0	1	Q(Motion)		11.04:0;0		0
12	1	0	0	1					
13	1	0	0	1					
14	2	0	0	1					
15	2	0	0	1	Q(Motion)		15.04:0;0		0
16	3	0	0	1					
17	4	0	0	1					

Performance results:

The screen shot of the running result is shown below, we can see that communicate with database takes less than 0.01s in a LAN. When deployed over the internet, the time will increase.

```
beacon ('192.168.0.101', 59424) registered
door ('192.168.0.101', 54593) registered
bulb ('192.168.0.101', 52232) registered
outlet ('192.168.0.101', 64089) registered
user ('192.168.0.101', 55945) registered
temperature ('192.168.0.101', 52177) registered
motion ('192.168.0.101', 64666) registered
door is Leader
door time offset 0.00204110145569
bulb time offset -0.000208854675291
User time offset -0.000221967697142
Gateway time offset -0.000271797180174
outlet time offset -0.000289916992186
motion time offset -0.000321865081786
```

```
temperature time offset -0.00034976005554
beacon time offset -0.000376939773558
0.98,motion,1

0.98,bulb,2

0.98,door,3

0.98,outlet,4

0.98,temperature,5

0.99,beacon,6

0.99,user,7

writedb takes 0.0120630264282
1.01,beacon,1

writedb takes 0.00912594795227
2.01,motion,1

readdb takes 0.00188589096069
Server mode: HOME
writedb takes 0.00974988937378
2.51,door,1

readdb takes 0.000878095626831
Server mode: AWAY
writedb takes 0.000942945480347
2.52,motion,0

writedb takes 0.00958490371704
3.02,beacon,0

writedb takes 0.00951910018921
3.03,motion,0

writedb takes 0.00195288658142
3.03,door,0

writedb takes 0.00122213363647
3.11,door,1

readdb takes 0.000977993011475
Server mode: AWAY
writedb takes 0.00965309143066
3.31,motion,1
```

readdb takes 0.00275087356567
Server mode: AWAY
Server: Someone in your room!
writedb takes 0.00107979774475
3.33,door,0

writedb takes 0.00956010818481
5.01,motion,0

writedb takes 0.00959205627441
6.31,beacon,1

writedb takes 0.00168800354004
6.32,door,1

readdb takes 0.0012629032135
Server mode: AWAY
writedb takes 0.0096390247345
7.01,motion,1

readdb takes 0.00279688835144
Server mode: HOME
writedb takes 0.00123405456543
7.03,door,0

writedb takes 0.00850605964661
8.01,motion,0

writedb takes 0.0010769367218
8.03,motion,0

writedb takes 0.00899505615234
11.03,motion,0

writedb takes 0.00948023796082
15.03,motion,0