

LAB-07

CSE2020

INTRODUCTION TO CPS LAB

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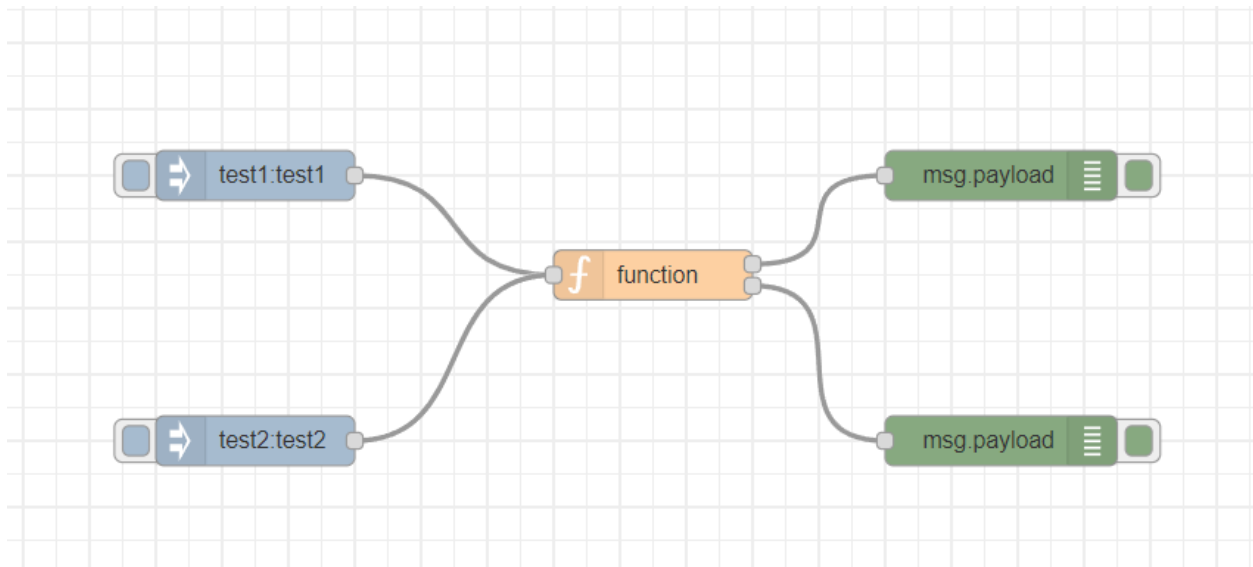
Date: February 28, 2022

Aim: To explore Node-Red.

Tools Used: Node-Red.

Practice 1: Compare two inputs and give a separate output.

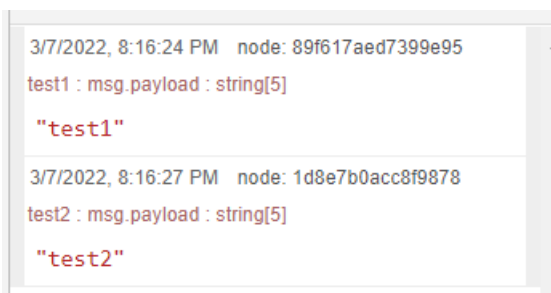
Flow:



Code:

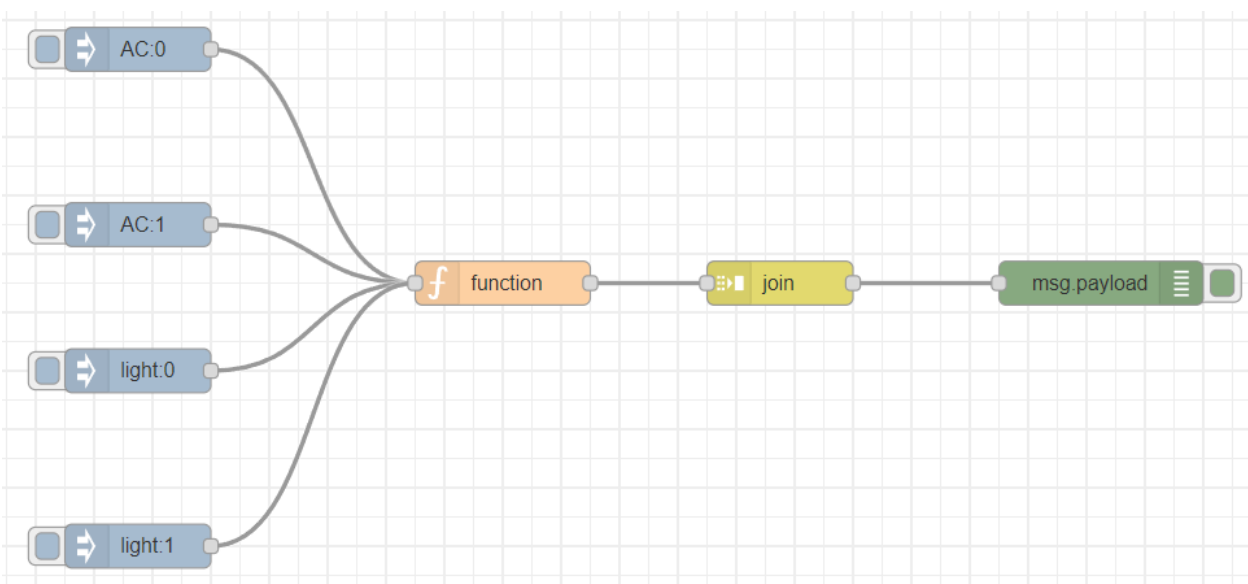
```
var topic = msg.topic;  
if(topic == "test1")  
    return [msg, null];  
if(topic == "test2")  
    return [null, msg];
```

Debug window:



Exercise 1: Simulate there are two sensors controlling the operation of two objects in two different rooms. the first sensor will operate the operation of AC and second sensor will control the operation of Light. Simulate the Node-Red Code for injecting two sensors that will display four different outputs.

Flow:



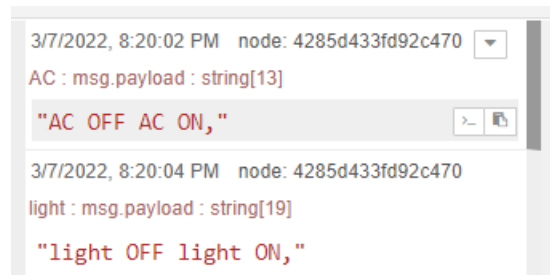
Code:

```
var topic=msg.topic;
if (msg.topic=="AC")
{
    if(msg.payload==1)
    {
        msg.payload="AC ON,";
    }
    else
    {
        msg.payload="AC OFF";
    }
}
else
{
    if(msg.payload==1)
    {
        msg.payload="light ON,";
    }
    else
    {
        msg.payload="light OFF";
    }
}
```

```
}
```

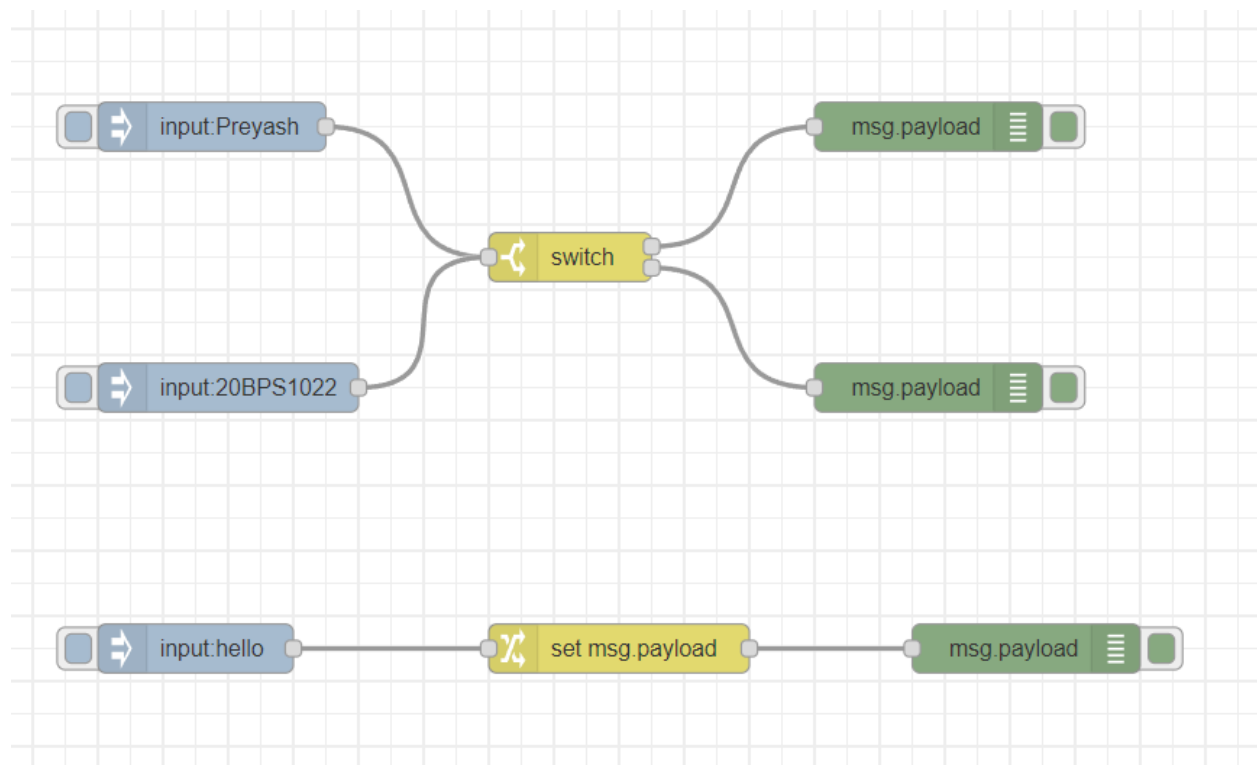
```
return msg;
```

Debug window:



Practice 2: Using Switch & Change Nodes.

Flow:



Edit switch node

Delete

Cancel

Done

⚙ Properties

⚙

📄

🖨

🔍 Name

Name

⋮ Property

▼ msg. payload

≡

== ▼

▼ a₂

Preyash

→ 1

✕

≡

== ▼

▼ a₂

20BPS1022

→ 2

✕

Edit change node

Delete

Cancel

Done

⚙ Properties

⚙

📄

🔗

📁 Name

☰ Rules

Set

▼

▼ msg.payload

to the value

▼ a_z

world

×

Debug window:

```
3/7/2022, 8:21:57 PM node: 3b76cbdda9b8e021
input : msg.payload : string[7]

"Preyash"

3/7/2022, 8:21:58 PM node: 16ab748b7d26658f
input : msg.payload : string[9]

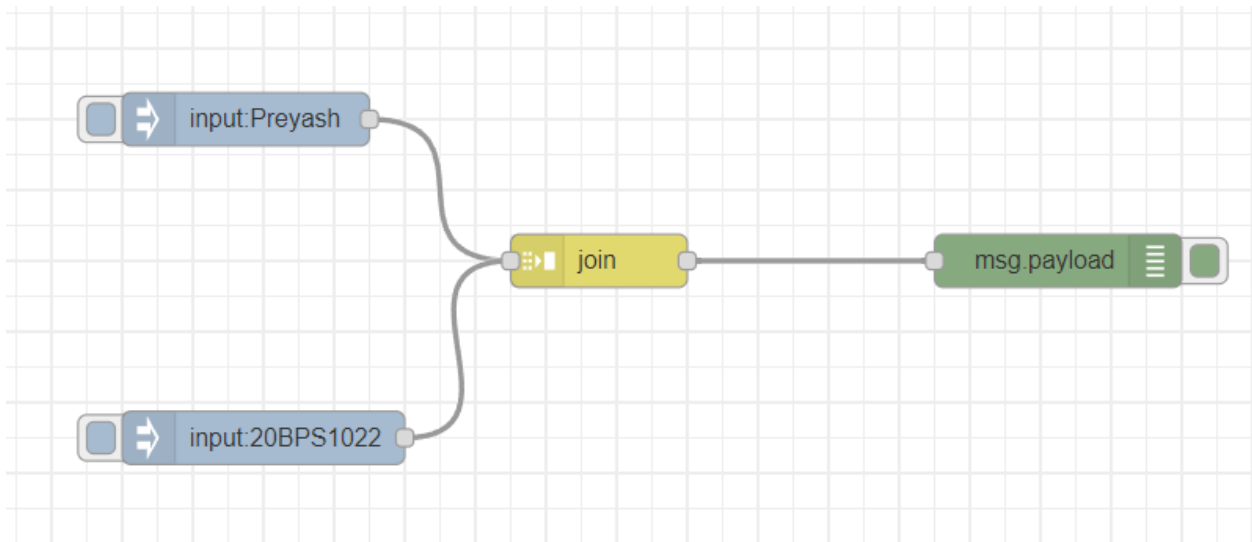
"20BPS1022"

3/7/2022, 8:21:59 PM node: 499dbca8055a1006
input : msg.payload : string[5]

"world"
```

Practice 3: Use the join Node.

Flow:



Edit join node

Delete Cancel Done

Properties

Mode: manual

Combine each: msg. payload

to create: a String

joined using: a₂

Send the message:

- After a number of message parts: 2
- After a timeout following the first message: seconds

Debug window:

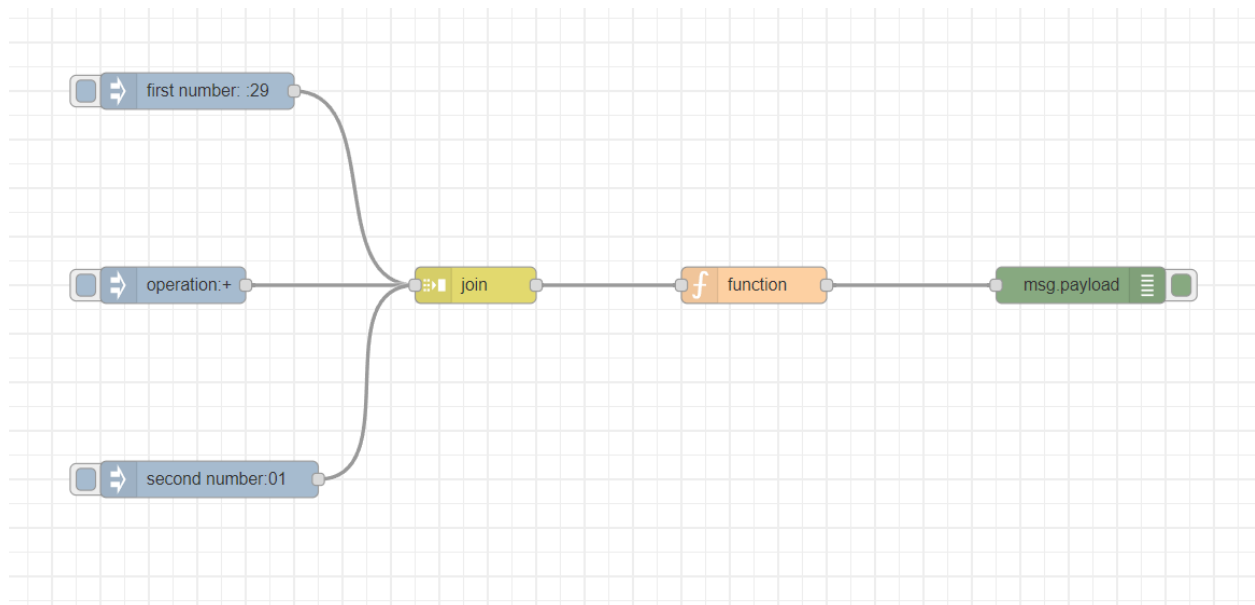
```
3/7/2022, 8:25:20 PM node: bf1ff79bc1f09446
input : msg.payload : string[17]
"Preyash 20BPS1022"
```

Task 2 and 3:

- Make a calculator program by injecting the two numbers and the operation to be performed.
- Make a calculator with only two inputs and provide output to all the arithmetic operations as a single output.

Flow:

Task 2:



Edit join node

Delete Cancel Done

Properties

Mode: manual

Combine each: msg.payload

to create: a String

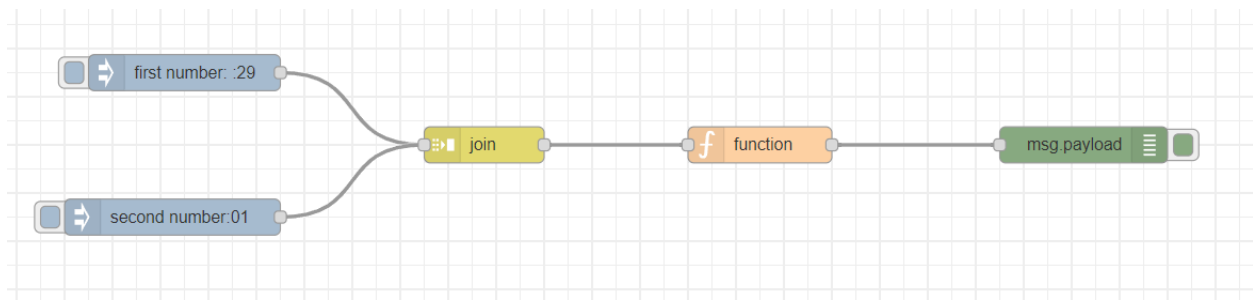
joined using: a_z

Send the message:

- After a number of message parts: 3
- After a timeout following the first message: seconds
- After a message with the msg.complete property set

Name: Name

Task 3:



Edit join node

Delete Cancel Done

Properties [Settings] [Copy] [Paste]

Mode: manual

Combine each: msg.payload

to create: a String

joined using: a_z

Send the message:

- After a number of message parts: 2
- After a timeout following the first message: seconds
- After a message with the `msg.complete` property set

Name: Name

Code:

Task 2:

```
op=msg.payload
```

```
msg.payload=eval(msg.payload)
```

```
return msg;
```


Task 3:

```
op=msg.payload
```

```
no1=op[0]
```

```
no2=op[1]
```

```
sum=no1+no2
```

```
diff=no1-no2
```

```
prod=no1*no2
```

```
Q=no1/no2
```

```
msg.payload='Sum =' +sum+' Difference =' +diff+' Product =' +prod+' Quotient =' +Q;
```

```
return msg;
```

Debug window:

Task 2:

3/7/2022, 8:31:09 PM node: 4ec3aa935fc52847

second number : msg.payload : number

30

Task 3:

3/7/2022, 8:31:40 PM node: 89bfc7fa49c994d0

second number : msg.payload : string[63]

"Sum =29 Difference =-7 Product =18

Quotient =0.2222222222222222"

Result: We have tested out the conditional statements in Node Red.