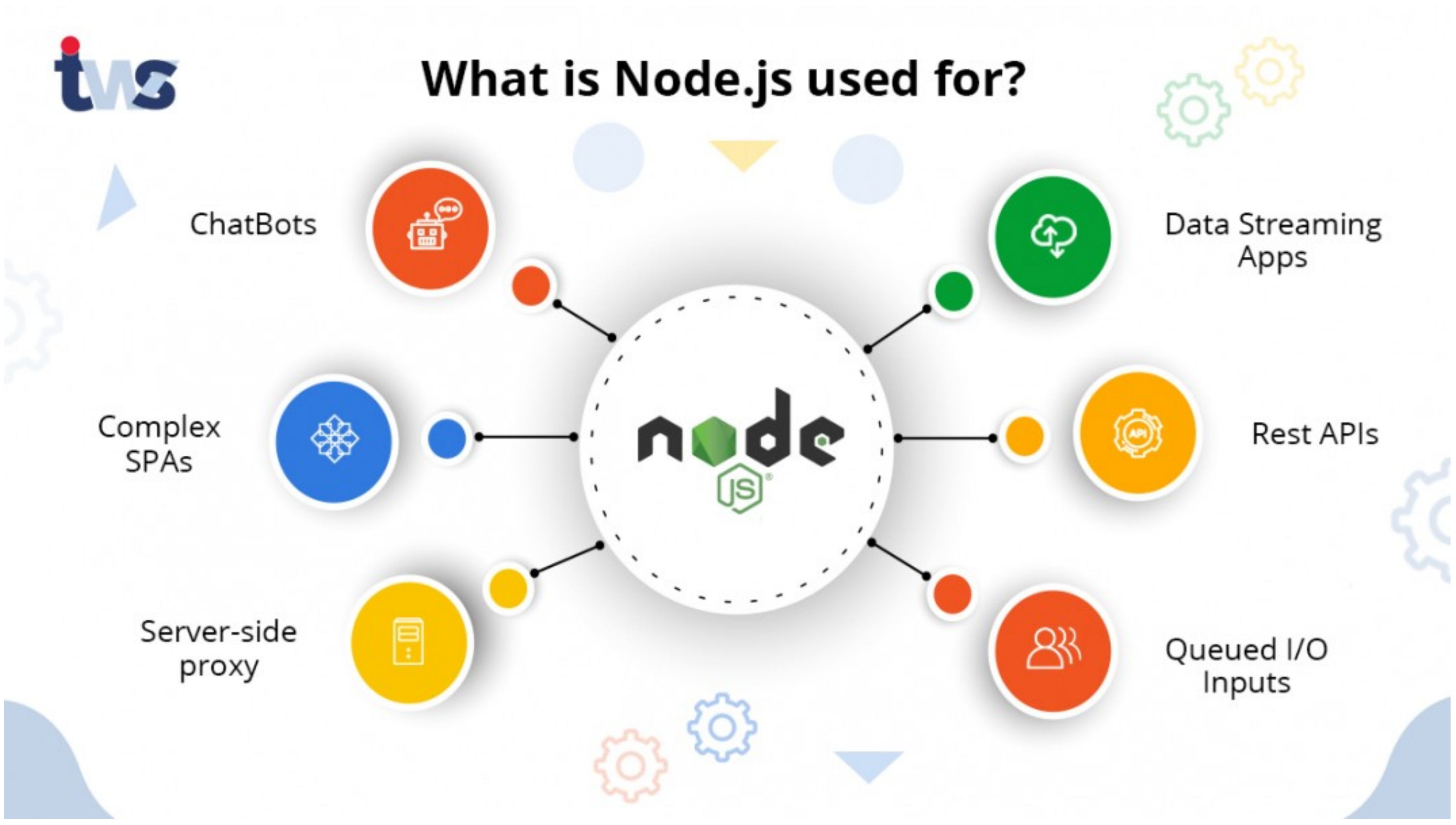
Google Sheet (IOT)

Jaydeep Shah – 28 April 2022

- **What is Node.js?**

Ans: Node.js (Node) is an open source development platform for executing JavaScript code at **Server side** (or for serve as per query). Node JS is an interpreter or running environment for a JavaScript programming language.

Note: Java Script and Java both are different things (here **no relation** with **JAVA** Programming language).



- **Important commands list in Google Sheet.**

onOpen(e) runs when a user **opens** a spreadsheet, document, presentation, or form that the user has permission to edit.

doGet(e) runs when a **user visits** a **web app** or a program sends an **HTTP GET** request to a web app.

doPost(e) runs when a program sends an **HTTP POST** request to a web app.

The **e** parameter in the function names above is an event object that is passed to the function.

➢ What is GET and POST method?

Two common methods for the request-response between a server and client are: **GET**- It requests the data from a specified resource. **POST**- It submits the processed data to a specified resource.

Both GET and POST method is used to transfer data from **client to server in HTTP protocol** but Main difference between POST and GET method is that **GET carries request parameter appended in URL** string while **POST carries request parameter in message body** which makes it more secure way of transferring data from client to server.

➢ What is WEB APP?

A web application is application software that runs on a web browser, unlike software programs that run locally and natively on the operating system of the device. A Web application (Web app) is **an application program that is stored on a remote server and delivered over the Internet through a browser interface.**

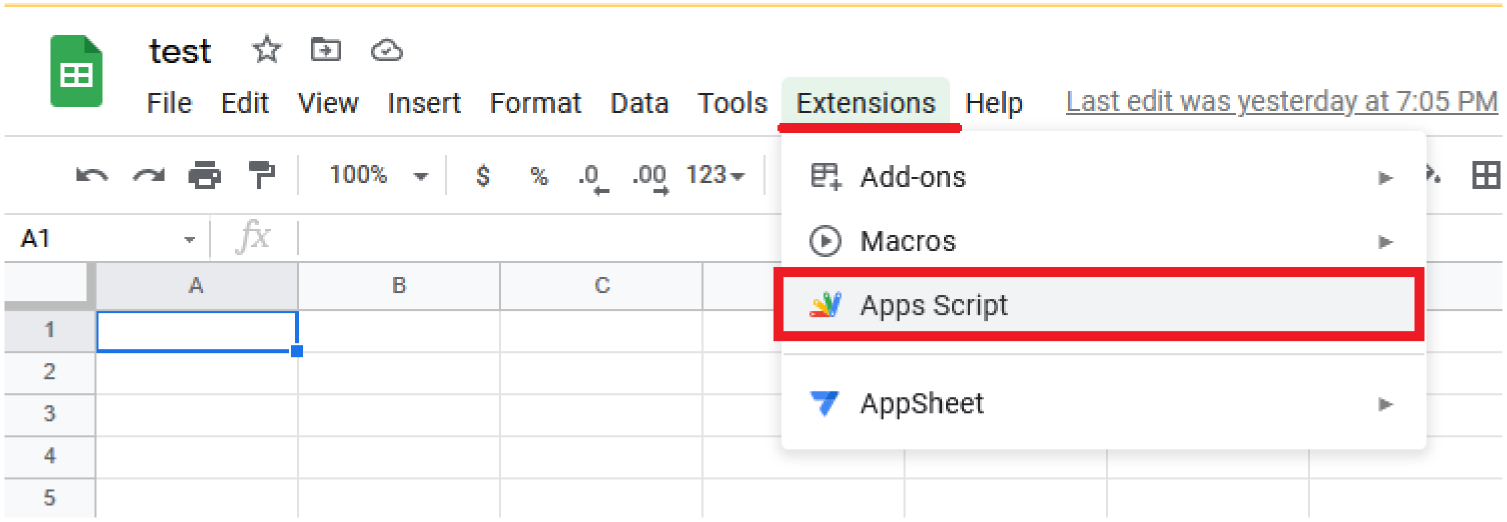
Example: Web applications include online forms, shopping carts, word processors, spreadsheets, video and photo editing, file conversion, file scanning, and email programs such as Gmail, Yahoo,Facebook etc.

➢ **doGet()** function of **JS,**used in Google APP scripts.

To create a web app with the HTML service, your code must include a **doGet()** function that tells the script how to serve the page. The function must return an HtmlOutput object, as shown in this example.

Let's take one example: PROJECT:1 Interaction with Script and HTML

Open Google Sheet and click on **Extension >> APP Script**



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Let’s add following scripts:

Our Web browser send HTTP request, and for handle this requesst we have to add **doGet()** function in our script.

CODE:

```
function doGet() {

  return HtmlService.createHtmlOutputFromFile('Index');

}
```

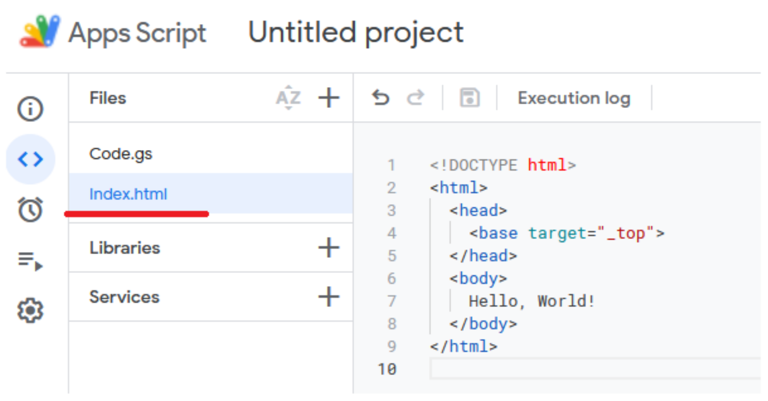
Using above script file ,we are going to return HTML service mentiioned in **Index.html** file.

So, lets created **HTML** response name Index.

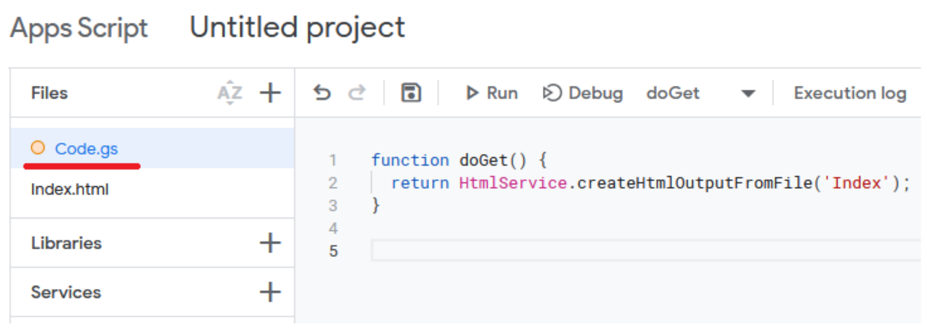
CODE:

```
<!DOCTYPE html>

<html>

  <head>

    <base target="_top">

  </head>

  <body>

    Hello, World!

  </body>

</html>
```

So, whenever we will call **URL** (given by GOOGLE during deployment time), this script will be called and in responsed we will get this HTML web page mentioned in above code.



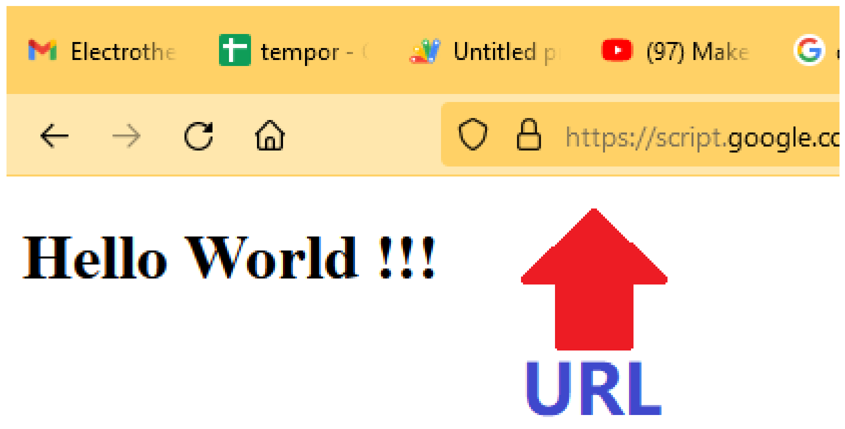
```
<!DOCTYPE html>
<html>
  <head>
    <base target="_top">
  </head>
  <body>
    Hello, World!
  </body>
</html>
```



```
function doGet() {
  return HtmlService.createHtmlOutputFromFile('Index');
}
```

RUN the code for making sure there is no any syntax error.

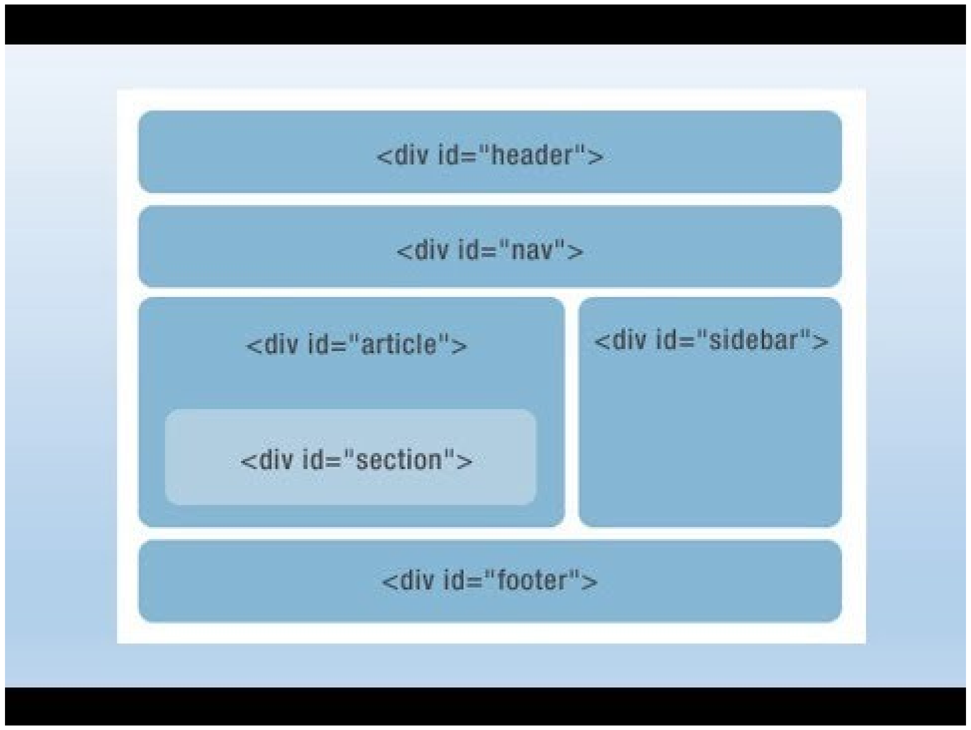
Ok.lets deploy the project and with deployment you will get the **URL,** copy that URL and paste it into WEB browser,you will get the response something like in below image.



PROJECT:2 Call the script Function from HTML

Let's learn some useful functions before getting started with new project.

<div> - In HTML, div and span tags are elements used to define parts of a document, so that they are identifiable when a unique classification is necessary. which is then styled with CSS or manipulated with JavaScript.



As shown in above image we can provide id for each UI object.

Lets see some important methods for calling google script object from HTML.

Methods

Method	Return type	Brief description
`withFailureHandler(function)`	`google.script.run`	Sets a callback function to run if the server-side function throws an exception.
`withSuccessHandler(function)`	`google.script.run`	Sets a callback function to run if the server-side function returns successfully.
`withUserObject(object)`	`google.script.run`	Sets an object to pass as a second parameter to the success and failure handlers.

Note: As mentioned in above table return type of function is google.script.run .

Lets create one project that can read Unread msg count from GMAIL inbox and provides HTML output.

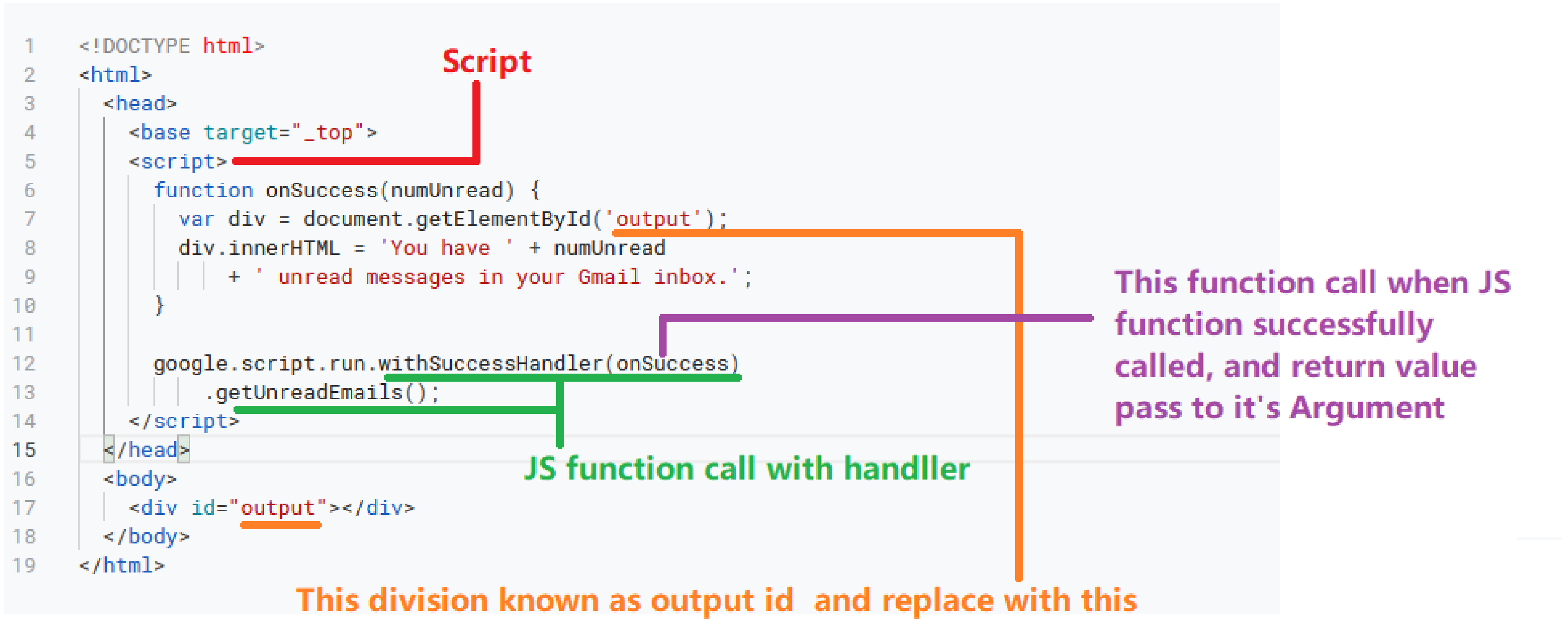
#Google Script code:

```
//Below function will be called when HTML request raised by URL

function doGet()

{

//return define : Take  HTML Service and load index.html page

return HtmlService.createHtmlOutputFromFile('Index');

}


//Lets create user define function

function getUnreadEmails()

{

//Define return: Use Gmail service to read unread emails

return  GmailApp.getInboxUnreadCount();

}
```

#HTML Script code:

```
<!DOCTYPE html>
<html>
  <head>
    <base target="_top">
    <script>
      function onSuccess(numUnread) {
        var div = document.getElementById('output');
        div.innerHTML = 'You have ' + numUnread
            + ' unread messages in your Gmail inbox.';
      }
      google.script.run.withSuccessHandler(onSuccess)
          .getUnreadEmails();
    </script>
  </head>
  <body>
    <div id="output"></div>
  </body>
</html>
```

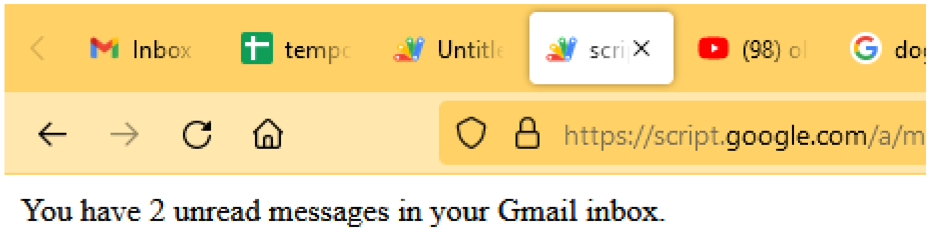
For more details lets understand script related functions used:



```
<!DOCTYPE html>
<html>
  <head>
    <base target="_top">
    <script>
      function onSuccess(numUnread) {
        var div = document.getElementById('output');
        div.innerHTML = 'You have ' + numUnread
            + ' unread messages in your Gmail inbox.';
      }

      google.script.run.withSuccessHandler(onSuccess)
          .getUnreadEmails();
    </script>
  </head>
  <body>
    <div id="output"></div>
  </body>
</html>
```

Script
This function call when JS function successfully called, and return value pass to it's Argument
JS function call with handller
This division known as output id and replace with this

OUTPUT:



You have 2 unread messages in your Gmail inbox.

You can see 2 Unread emails output in browser.

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Same way you can pass the Argument and use that value for further process in JS.

Suppose I will be called function with pass argument 50

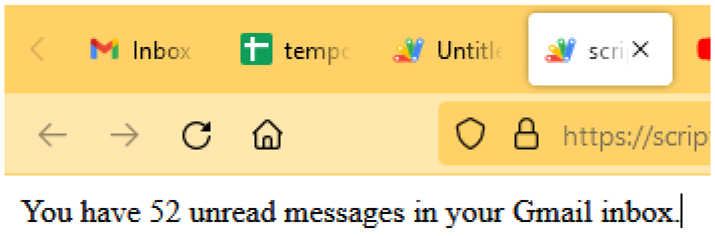
#HTML :

```
google.script.run.withSuccessHandler(onSuccess)
          .getUnreadEmails(50);
```

# Google Script:

```
function getUnreadEmails(t) {
  // 'got' instead of 'get' will throw an error.
  var e = t;
  return (e + GmailApp.getInboxUnreadCount());

}
```

OUTPUT:



You have 52 unread messages in your Gmail inbox.

PROJECT: 3 Google SHEET value Insertion using Google Script

In this project we are going to update Google SHEET using HTTP request received from Internet.

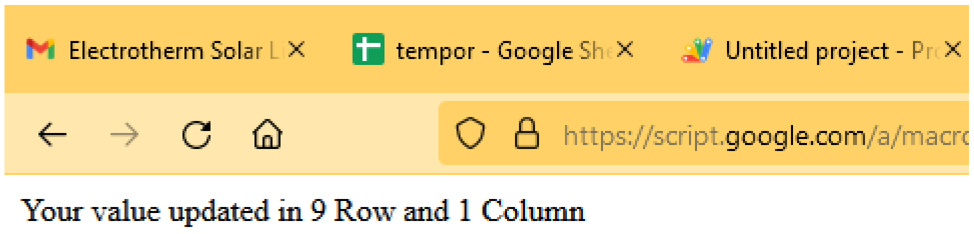
#Google Script code:

```
//Function to Handle HTTP request from URL

function doGet() {
  return HtmlService.createHtmlOutputFromFile('Index');
}


//User Define Function for update value in sheet
function set_sheet_value(arg_variable) {

  //Take Handler to deal with active sheet

  var sheet = SpreadsheetApp.getActiveSpreadsheet().getActiveSheet();

  //Take control over one cell
 var ROW = sheet.getLastRow();
 var COL = sheet.getLastColumn();

 //Lets increment ROW number
 ROW = ROW + 1;

  //Now cell becomes
var active_cell = sheet.getRange(ROW,COL);

//Insert value given by Argument
active_cell.setValue(90);

var return_data  = [ROW,COL];


//Return active cell
return(return_data);

}
```

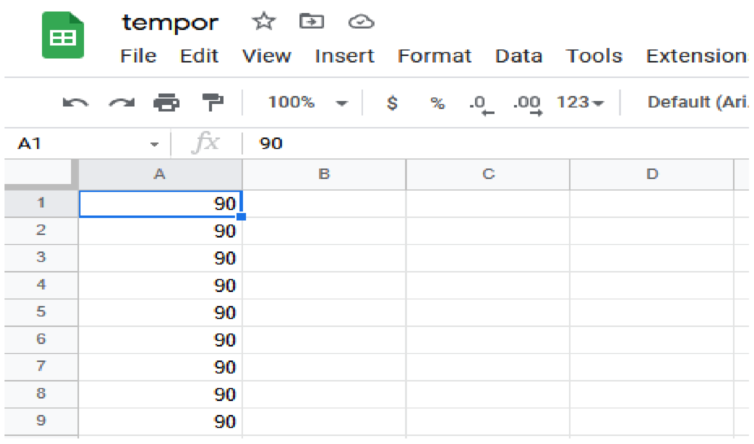
#HTML SCRIPT:

```
<!DOCTYPE html>
<html>
  <head>
    <base target="_top">
    <script>
      function onSuccess(receive_var) {
        var div = document.getElementById('output');
        div.innerHTML = 'Yoour value updated in ' + receive_var[0] + ' Row and ' + receive_var[1]
            + ' Column';
      }

      google.script.run.withSuccessHandler(onSuccess)
          .set_sheet_value(50);
    </script>
  </head>
  <body>
    <div id="output"></div>
  </body>
</html>
```

#OUTPUT



Your value updated in 9 Row and 1 Column


tempor
File Edit View Insert Format Data Tools Extension
100% $ % .0 .00 123 Default (Ari
A1
fx
90

	A	B	C	D
1	90			
2	90			
3	90			
4	90			
5	90			
6	90			
7	90			
8	90			
9	90			

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Extra Notes:

Google Apps Script provides several top-level classes. These main classes allow you to access features of other Google apps and services, for example:

- **Google Sheets** can be accessed using **SpreadsheetApp** class
- **Google Docs** can be accessed using **DocumentApp** class
- **Google Drive** can be accessed using **DriveApp** class
- **Gmail** can be accessed using **GmailApp** class
- **Language** service can be accessed using **LanguageApp** class

PROJECT 4: Send value through HTTP request to Java Script

Let's understand some basic things regarding HTTP protocol.

- **Query string in HTTP / URL**

A query string is the **portion of a URL** where data is **passed** to a web application and/or back-end database.

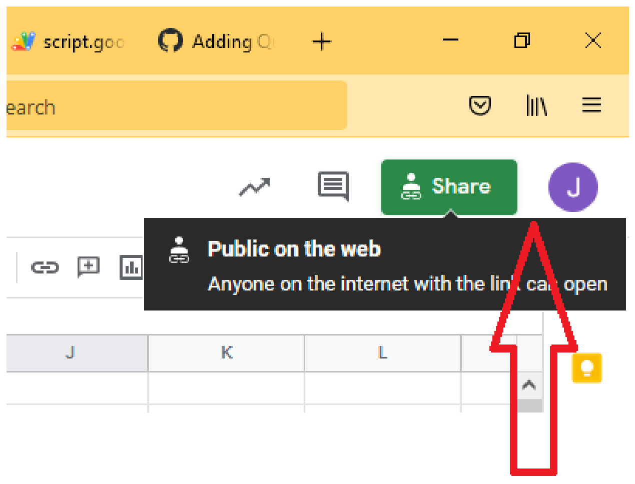
Note : Two basic requirements for creating Web App.

1) Method must contain doGet(e) or doPost(e) methods / function to handle HTTP request.
2) And above function must return HTML serice / output.

Here are some common steps to use **/ create web APP and store data into Spreadsheet**.

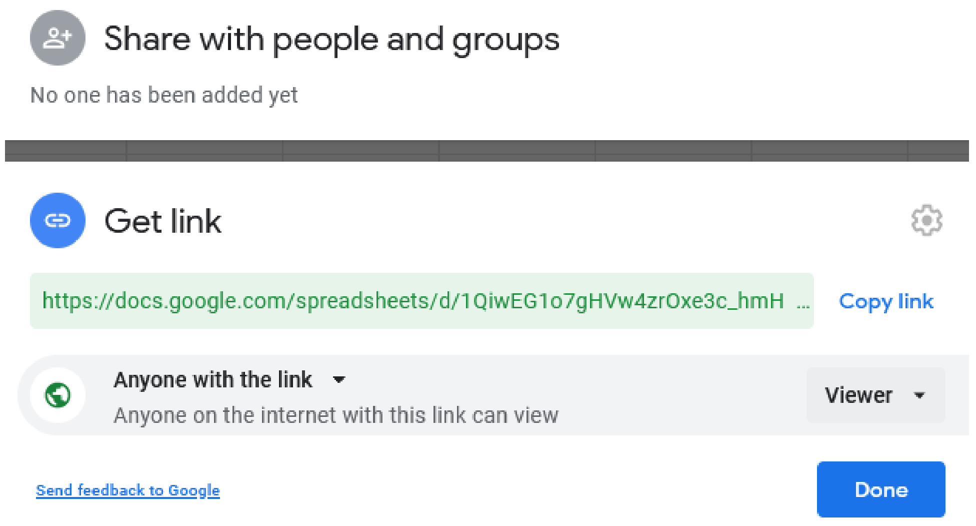
1) First step is Access Spread sheet.
2) Create doPost(e) or doGet(e) method for handle request
3) addUser() method to add data to spread sheet
4) return statu to client.

How Access Spreadsheet using URL???



Public on the web
Anyone on the internet with the lin can open

Click here to get URL



No one has been added yet

https://docs.google.com/spreadsheets/d/1QiwEG1o7gHVw4zrOxe3c_hmH ...

Anyone with the link
Anyone on the internet with this link can view

2) Change Viewer Option settings

➔ How handle HTML request in Google script??

HTML query we can handle in argument object as a '**e**' into doGet() or doPost(e) method.

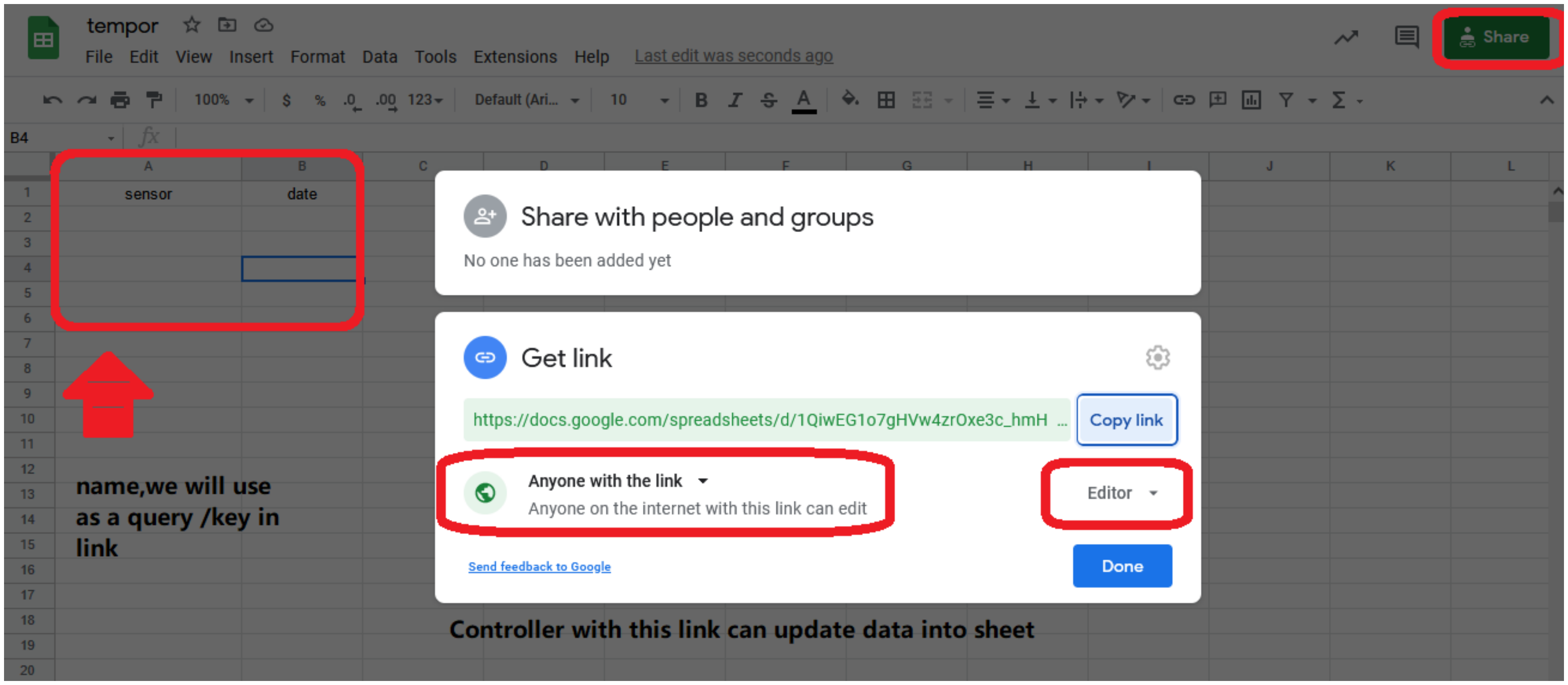
Link : https://developers.google.com/apps-script/guides/web

Let's start project

1) Make Ready Google Sheet for storing data.
   - ➢ Give Proper name to each column
   - ➢ Give it proper permission so anyone with this link can add data and access it

Step One : **Make sheet ready!!**

Lets provide name of column – sensor and date as shown in below image


tempor
File Edit View Insert Format Data Tools Extensions Help
Last edit was seconds ago
Share
sensor
date
name,we will use as a query /key in link
Share with people and groups
No one has been added yet
Get link
https://docs.google.com/spreadsheets/d/1QiwEG1o7gHVw4zrOxe3c_hmH ...
Copy link
Anyone with the link
Anyone on the internet with this link can edit
Editor
Send feedback to Google
Done
Controller with this link can update data into sheet

#Script code:

```
//Step (1) Access the spread sheet  --
//You can find Google sheet URL in web browser address bar when sheeet is open

//Using URL we will open our workbook first
var work_book = SpreadsheetApp.openByUrl('https://docs.google.com/spreadsheets/d/1QiwEG1o7gHVw4zrOxe3c_hmH2tz9CY67XZHnQBmDxt8/edit?usp=sharing');


//Now access particular sheet from workbook
var sheet_handle = work_book.getSheetByName('Sheet1');




//Step (2) Handle incomming data using doGet() or doPost() method

function doGet(e)    // e is handller for incoming data
{

var sensor = Number(e.parameter.sensor);  //We are interested in sensor keyword and convert string into number
var date = Number(e.parameter.date);      //same as with date keywordd
sheet_handle.appendRow([sensor,date]);    //Append data into new row


//Response by simple text -- or we can use HTML script
return ContentService.createTextOutput("Success call completed").setMimeType(ContentService.MimeType.TEXT);


}
```

Now let's save this and deploy this script and copy URL

TEST:

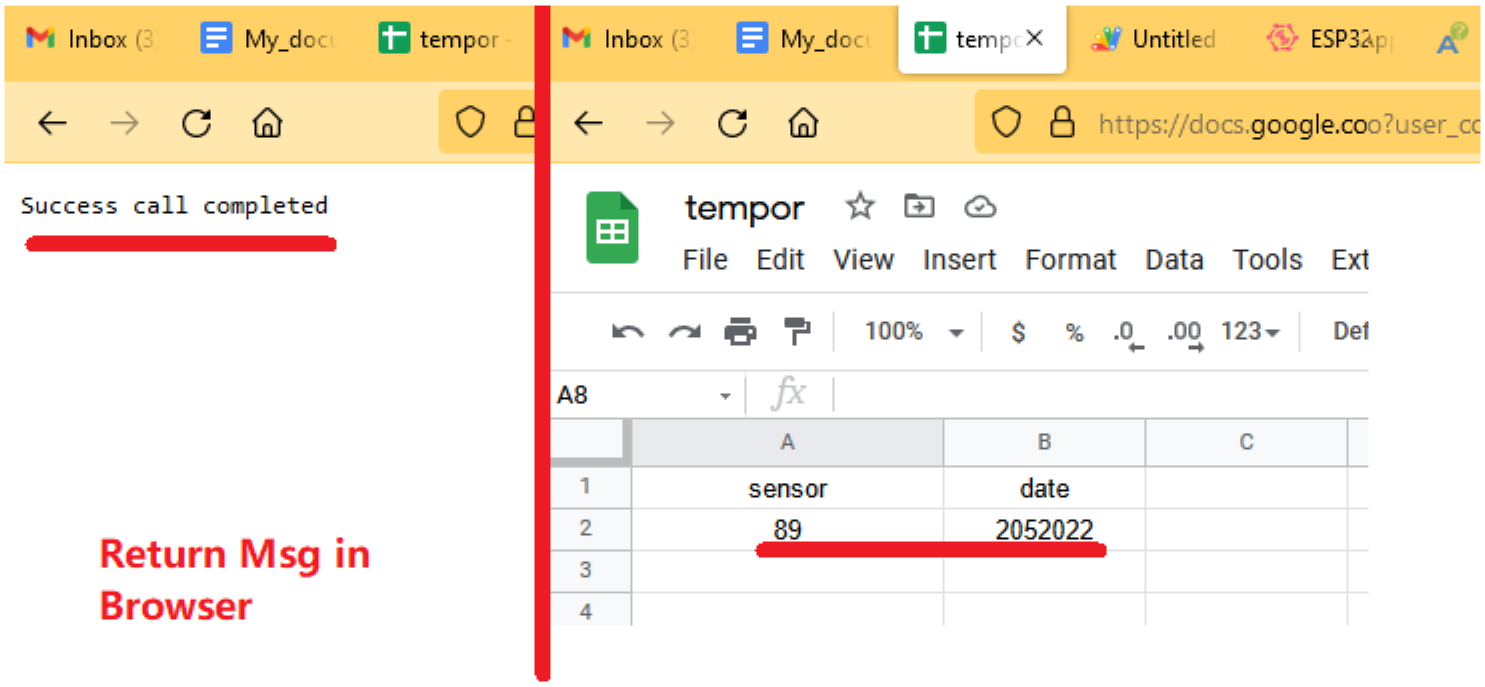
Pls add following string at the end of URL link

?sensor=89&date=02052022

Example:

https://script.google.com/macros/s/AKfycby_qtebdbfFNe14a-rG6LbIrZrGnqh_0Px9BHZrTi72Re2GA/exec**?sensor=89&date=02052022**

Copy link into address bar and check your Google Sheet.


Inbox (3
My_docu
tempor
Untitled
ESP32ap
https://docs.google.com/...?user_c
tempor
File Edit View Insert Format Data Tools Ext
100%
A8
Return Msg in Browser

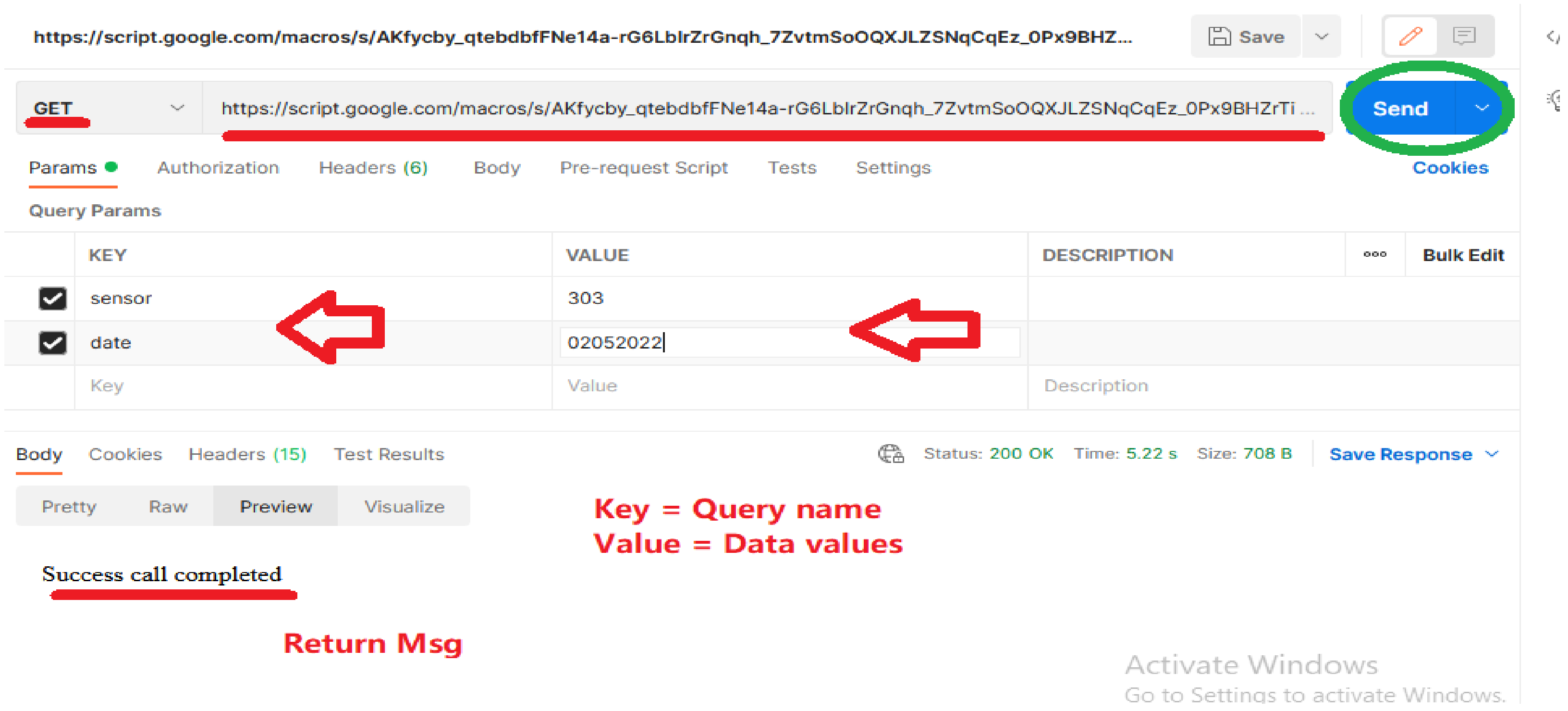
```
Success call completed
```

	A	B	C
1	sensor	date	
2	89	2052022	
3			
4			

Postman Application for Testing Link

We can use Postman Application for sending Data / Testing Link

Look in below solution:



https://script.google.com/macros/s/AKfycby_qtebdbfFNe14a-rG6LblrZrGnqh_7ZvtmSoOQXJLZSNqCqEz_0Px9BHZ...

GET https://script.google.com/macros/s/AKfycby_qtebdbfFNe14a-rG6LblrZrGnqh_7ZvtmSoOQXJLZSNqCqEz_0Px9BHZrTi ...

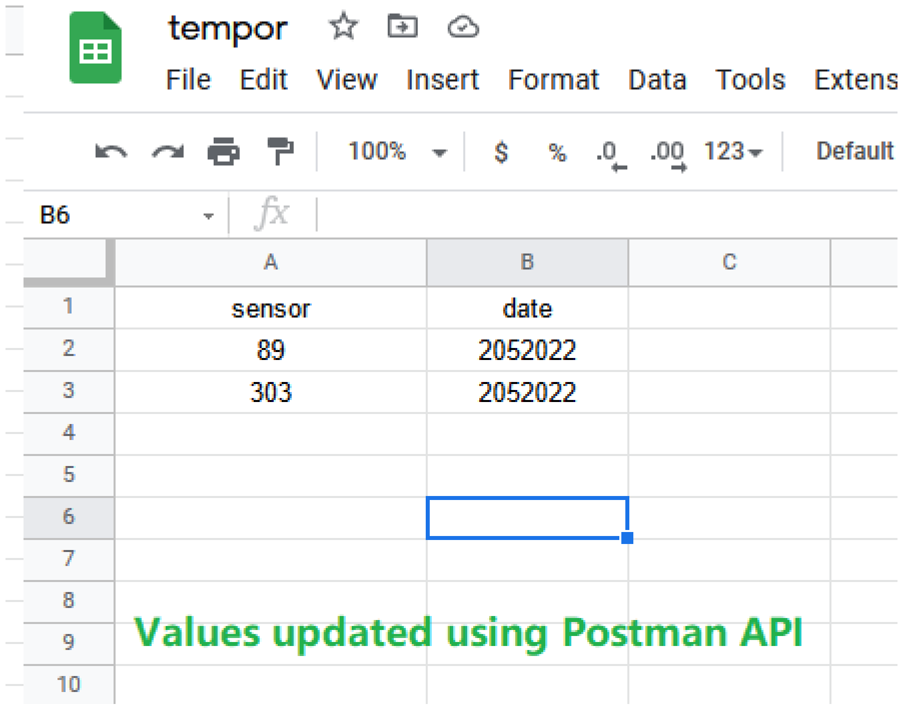
	KEY	VALUE	DESCRIPTION
✓	sensor	303	
✓	date	02052022	
	Key	Value	Description

Status: 200 OK Time: 5.22 s Size: 708 B

Success call completed

Key = Query name
Value = Data values

Output in Google sheet


tempor
File Edit View Insert Format Data Tools Extens
100% $ % .0 .00 123 Default
B6
Values updated using Postman API

	A	B	C
1	sensor	date	
2	89	2052022	
3	303	2052022	

Project 5: Handle Other Google Services using App Script (Google Dox)

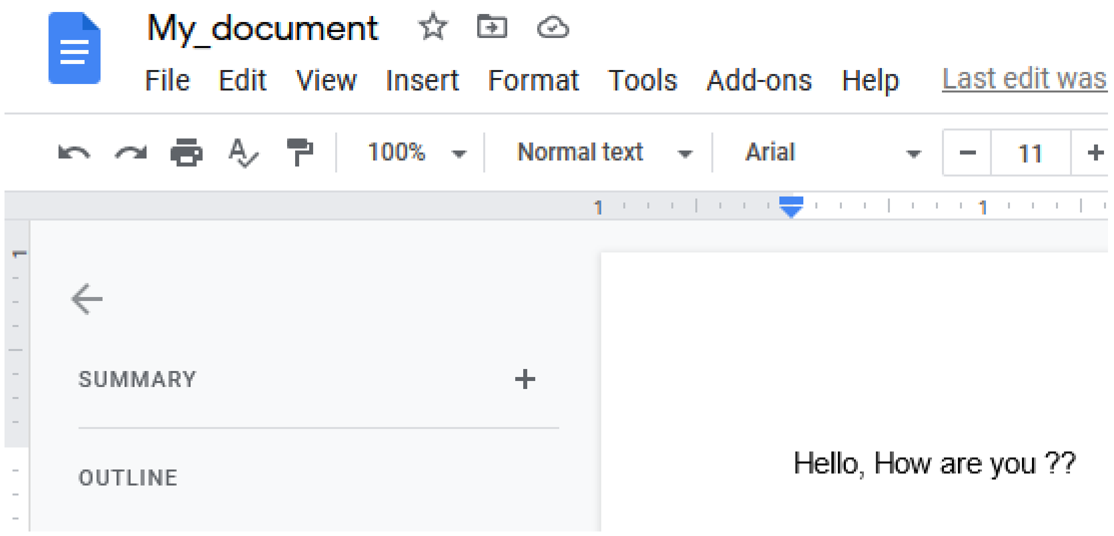
In this project we will handle Google Dox from Google Sheet and related APP script.

So Lets do it !!!

#**SCRIPT CODE**:

```
//Create Google Dox and Update conteent from Script function

function Doc_update()
{
  var abc = 'Hello, How are you ??';

  //Create var to handle google doc

  var doc_handller = DocumentApp.create('My_document');  //Here You can use open by Name / ID for update in exist
ing Doc

  doc_handller.setText(abc);  //Set text

  doc_handller.saveAndClose();
}
```

Output:

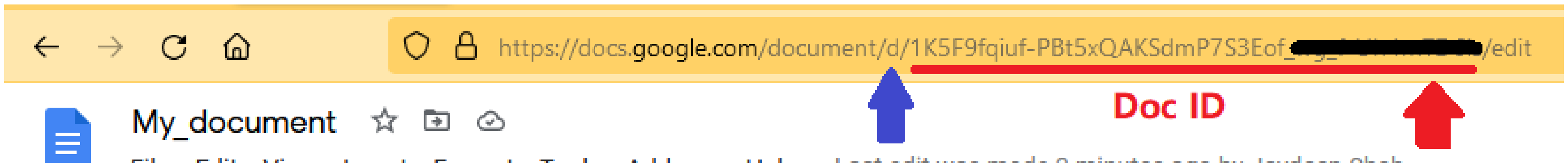


Hello, How are you ??

We can also open existing **Doc** and can append data into it..

➔ How Find Id of Sheet or Doc ???

Answer is look at address bar of your Browser, Here you can find id in **URL.** …./d/…..text….   text after /d/ indicates doc id or sheet id.


https://docs.google.com/document/d/1K5F9fqiuf-PBt5xQAKSdmP7S3Eof[redacted]/edit

So Lets append data instead of create new dox.

```
//Create Google Dox and Update conteent from Script function

function Doc_update()
{
  var abc = 'Hello, How are you ??';

  //Create var to handle google doc

  var doc_handller = DocumentApp.openById('1K5F9fqiuf-PBt5xQAKSdmP7S3Eof_wg_f-Uh4mTD6is'); // Open by ID

  doc_handller.getBody().appendParagraph(abc); //Get the control of DOC body and update



  doc_handller.saveAndClose(); //Save and close

}
```

Now if the function will be run three times then each time new paragraph is append in to document.

Lets check the output of the function.

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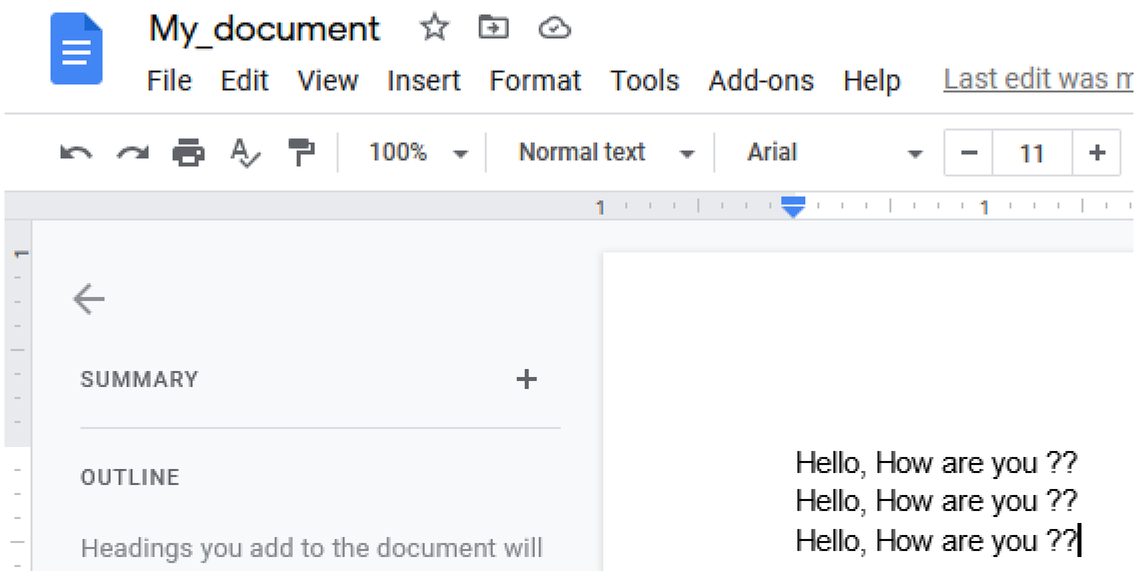
Output:


My_document
File Edit View Insert Format Tools Add-ons Help
Last edit was m
100%
Normal text
Arial
11
SUMMARY
OUTLINE
Headings you add to the document will

```
Hello, How are you ??
Hello, How are you ??
Hello, How are you ??
```

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Ahmedabad – India

Document Publication date 2 May 2, 2022

#IOT

#Google_script

#Embedded