CS104 (SSL)- Project Submission: Spreadsheets

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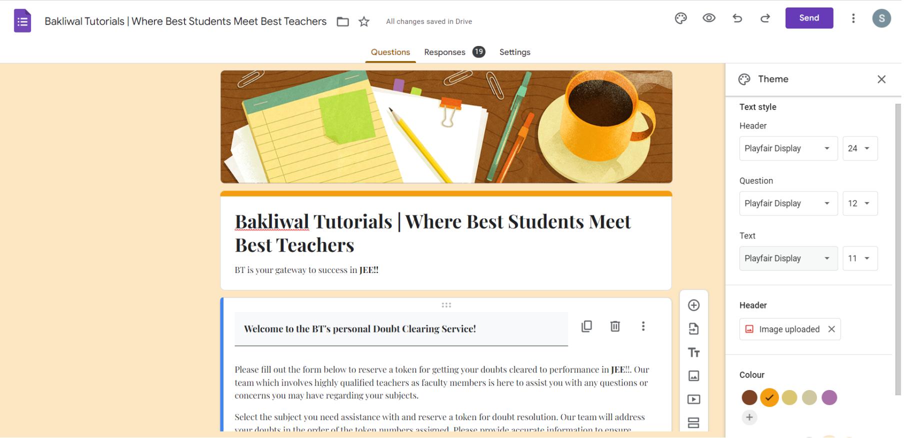
1 Project description

- General description :
  In this project, we build a simple token system that will mimic a virtual queue and assign tokens to people based on the order in which people filled a form. The system involves collecting responses from people using google forms, storing the data in a Spreadsheet and using it to generate a token system which allots token on basis of the order in which the form was filled by different users.
- My Project :
  I have implemented the task given in the form of a personalised doubt clearing service. The google form shared with all the students of Bakliwal Tutorials will collect their responses in a spreadsheet for a personalized doubt clearing service. According to the sequence in which the form was filled by students they will be allotted a token number and hence a time slot for their appointment which they will be informed the mail.

2 Implementation and Customization

2.1 Google form

Link of the google shared with students that will collect data in a Spreadsheet:
https://forms.gle/akwdd5JU68h3iJsT9
The google form collects Name, Email ID, Contact number, Subject in which the student has a doubt in and the nearest BT center for him/her as data.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All changes saved in Drive
Send
S
Questions
Responses 19
Settings
Theme
Image uploaded
Colour

Text style
Header
Playfair Display 24
Question
Playfair Display 12
Text
Playfair Display 11

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BT is your gateway to success in **JEE!!**

Welcome to the BT's personal Doubt Clearing Service!

Please fill out the form below to reserve a token for getting your doubts cleared to performance in **JEE!!**. Our team which involves highly qualified teachers as faculty members is here to assist you with any questions or concerns you may have regarding your subjects.

Select the subject you need assistance with and reserve a token for doubt resolution. Our team will address your doubts in the order of the token numbers assigned. Please provide accurate information to ensure

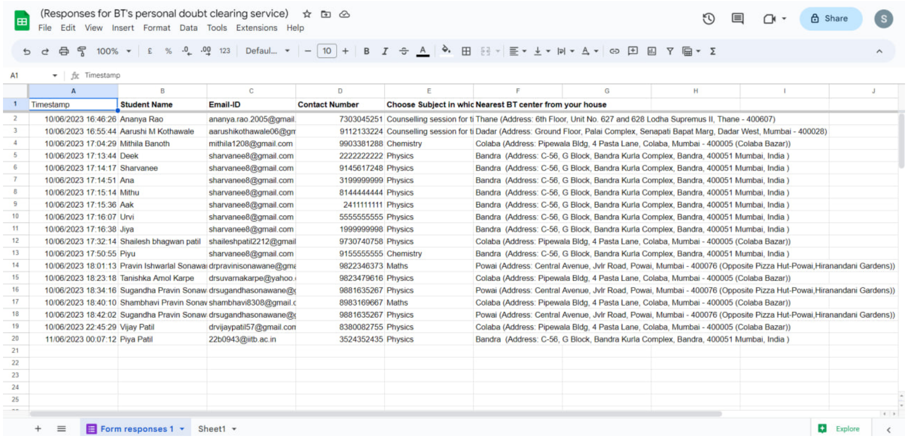
2.2 Customization

An input for nearest BT center and the subject of concern is taken from the form filler. So there is unique queue for every center and each center maintains a separate queue for different subjects. The appointments end at 1pm and a new mail is generated at 1:30 pm which is sent to all the students who had an appointment scheduled that day, providing them with a feedback form for the service where they can rate the session and also suggest improvements in the service.

2.3 Linked Spreadsheet

The data received from the google form responses is collected in a Spreadsheet.

Spreadsheet link:
https://docs.google.com/spreadsheets/d/1ni5HYcR82v5eiC1Fr_tZ8dmTV-bK1RubTCv3k2sjxuM/edit?usp=sharing

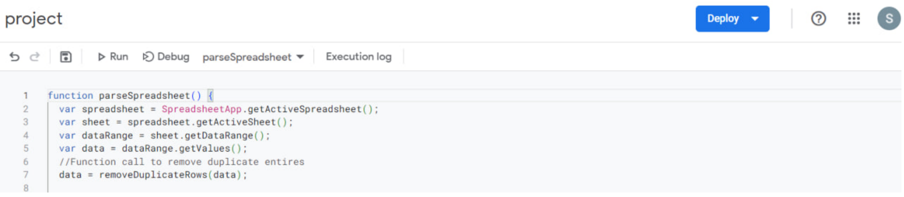

(Responses for BT's personal doubt clearing service)
File Edit View Insert Format Data Tools Extensions Help
100%
Defaul...
10
Share
A1
Timestamp
Form responses 1
Sheet1
Explore

	A	B	C	D	E	F
1	Timestamp	Student Name	Email-ID	Contact Number	Choose Subject in whic	Nearest BT center from your house
2	10/06/2023 16:46:26	Ananya Rao	ananya.rao.2005@gmail.	7303045251	Counselling session for ti	Thane (Address: 6th Floor, Unit No. 627 and 628 Lodha Supremus II, Thane - 400607)
3	10/06/2023 16:55:44	Aarushi M Kothawale	aarushikothawale06@gm	9112133224	Counselling session for ti	Dadar (Address: Ground Floor, Palai Complex, Senapati Bapat Marg, Dadar West, Mumbai - 400028)
4	10/06/2023 17:04:29	Mithila Banoth	mithila1208@gmail.com	9903381288	Chemistry	Colaba (Address: Pipewala Bldg, 4 Pasta Lane, Colaba, Mumbai - 400005 (Colaba Bazar))
5	10/06/2023 17:13:44	Deek	sharvanee8@gmail.com	2222222222	Physics	Bandra (Address: C-56, G Block, Bandra Kurla Complex, Bandra, 400051 Mumbai, India)
6	10/06/2023 17:14:17	Sharvanee	sharvanee8@gmail.com	9145617248	Physics	Bandra (Address: C-56, G Block, Bandra Kurla Complex, Bandra, 400051 Mumbai, India)
7	10/06/2023 17:14:51	Ana	sharvanee8@gmail.com	3199999999	Physics	Bandra (Address: C-56, G Block, Bandra Kurla Complex, Bandra, 400051 Mumbai, India)
8	10/06/2023 17:15:14	Mithu	sharvanee8@gmail.com	8144444444	Physics	Bandra (Address: C-56, G Block, Bandra Kurla Complex, Bandra, 400051 Mumbai, India)
9	10/06/2023 17:15:36	Aak	sharvanee8@gmail.com	2411111111	Physics	Bandra (Address: C-56, G Block, Bandra Kurla Complex, Bandra, 400051 Mumbai, India)
10	10/06/2023 17:16:07	Urvi	sharvanee8@gmail.com	5555555555	Physics	Bandra (Address: C-56, G Block, Bandra Kurla Complex, Bandra, 400051 Mumbai, India)
11	10/06/2023 17:16:38	Jiya	sharvanee8@gmail.com	1999999998	Physics	Bandra (Address: C-56, G Block, Bandra Kurla Complex, Bandra, 400051 Mumbai, India)
12	10/06/2023 17:32:14	Shailesh bhagwan patil	shaileshpatil2212@gmail	9730740758	Physics	Colaba (Address: Pipewala Bldg, 4 Pasta Lane, Colaba, Mumbai - 400005 (Colaba Bazar))
13	10/06/2023 17:50:55	Piyu	sharvanee8@gmail.com	9155555555	Chemistry	Bandra (Address: C-56, G Block, Bandra Kurla Complex, Bandra, 400051 Mumbai, India)
14	10/06/2023 18:01:13	Pravin Ishwarlal Sonawa	drpravinisonawane@gma	9822346373	Maths	Powai (Address: Central Avenue, Jvlr Road, Powai, Mumbai - 400076 (Opposite Pizza Hut-Powai,Hiranandani Gardens))
15	10/06/2023 18:23:18	Tanishka Amol Karpe	drsuvarnakarpe@yahoo.	9823479616	Physics	Colaba (Address: Pipewala Bldg, 4 Pasta Lane, Colaba, Mumbai - 400005 (Colaba Bazar))
16	10/06/2023 18:34:16	Sugandha Pravin Sonaw	drsugandhasonawane@	9881635267	Physics	Powai (Address: Central Avenue, Jvlr Road, Powai, Mumbai - 400076 (Opposite Pizza Hut-Powai,Hiranandani Gardens))
17	10/06/2023 18:40:10	Shambhavi Pravin Sonav	shambhavi8308@gmail.c	8983169667	Maths	Colaba (Address: Pipewala Bldg, 4 Pasta Lane, Colaba, Mumbai - 400005 (Colaba Bazar))
18	10/06/2023 18:42:02	Sugandha Pravin Sonaw	drsugandhasonawane@	9881635267	Physics	Powai (Address: Central Avenue, Jvlr Road, Powai, Mumbai - 400076 (Opposite Pizza Hut-Powai,Hiranandani Gardens))
19	10/06/2023 22:45:29	Vijay Patil	drvijaypatil57@gmail.con	8380082755	Physics	Colaba (Address: Pipewala Bldg, 4 Pasta Lane, Colaba, Mumbai - 400005 (Colaba Bazar))
20	11/06/2023 00:07:12	Piya Patil	22b0943@iitb.ac.in	3524352435	Physics	Bandra (Address: C-56, G Block, Bandra Kurla Complex, Bandra, 400051 Mumbai, India)

2.4 Explanation of Code

Get the full code here : https://drive.google.com/drive/folders/1MdtYGxws97HgdnxY2DXLEXtnrXQn0GoS?usp=sharing
Go through the following explanations for each section of the code I have written in Apps Script and understand the beauty of using Google sheets API to read a spreadsheet and perform the task given.In the extensions section of the spreadsheet, we can use Apps Script to work on the data it has. The form opens at 8am everyday and closes by 8.30am. At 8:30am the Apps Script code is run to generate tokens. For this the spreadsheet is parsed.

2.4.1 Storing the Spreadsheet data

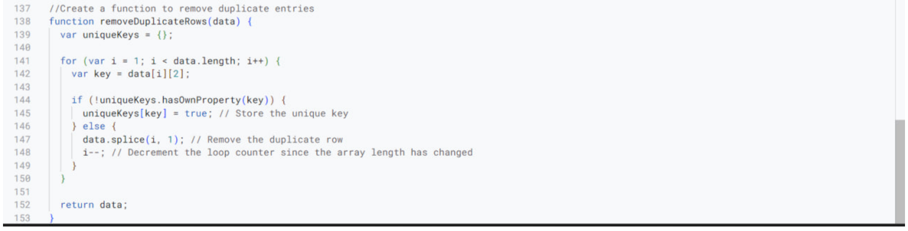


```
function parseSpreadsheet() {
  var spreadsheet = SpreadsheetApp.getActiveSpreadsheet();
  var sheet = spreadsheet.getActiveSheet();
  var dataRange = sheet.getDataRange();
  var data = dataRange.getValues();
  //Function call to remove duplicate entires
  data = removeDuplicateRows(data);

```

- SpreadsheetApp.getActiveSpreadsheet() and getActiveSheet():
  These functions return the currently active spreadsheet in Google Sheets and the sheet in that spreadsheet respectively.[1]
- getDataRange():
  This function returns the range of cells that contains data in the selected sheet.[1]
- getValues():
  It returns a two-dimensional array where each element represents the value of a single cell.[1]

2.4.2 Removing duplicate entries

A 2D array called 'data' is created. A row with index i in 'data' is accessed using data[i-1] and row[j-1] stores the column information of the (j)th column. All the sections filled by the user are

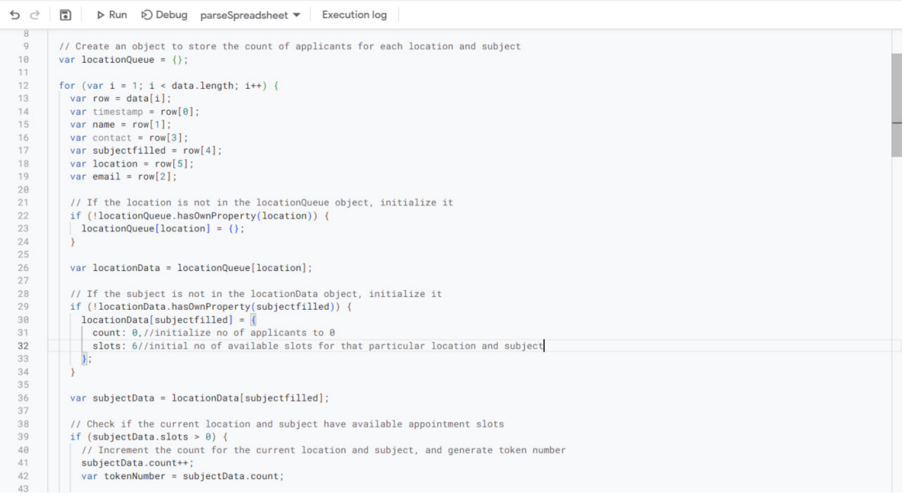


```
//Create a function to remove duplicate entries
function removeDuplicateRows(data) {
  var uniqueKeys = {};

  for (var i = 1; i < data.length; i++) {
    var key = data[i][2];

    if (!uniqueKeys.hasOwnProperty(key)) {
      uniqueKeys[key] = true; // Store the unique key
    } else {
      data.splice(i, 1); // Remove the duplicate row
      i--; // Decrement the loop counter since the array length has changed
    }
  }

  return data;
}
```

assigned to variables. Now the function removeDuplicateRows is called and data variable is passed as an argument to it.[2]

- removeDuplicateRows(data):
  This function defines a new variable 2D array of name uniqueKeys and the variable key stores the Email-ID column.The hasOwnProperty(key) method is used to check if the uniqueKeys object contains the current key. If the key is not present in uniqueKeys, it means that the current row is unique and has not been encountered before. In this case, the key is added to the uniqueKeys object by assigning true to it. This ensures that future rows with the same key will be recognized as duplicates. If the key is already present in uniqueKeys, it means that the current row is a duplicate. In this case, the splice(i, 1) method is used to remove the duplicate row from the data array at the current index i. Since the splice() operation modifies the array and reduces its length, it is necessary to decrement the loop counter i by 1 to ensure that the next iteration processes the correct row. Hence, the data array is updated to eliminate out duplicate entries.

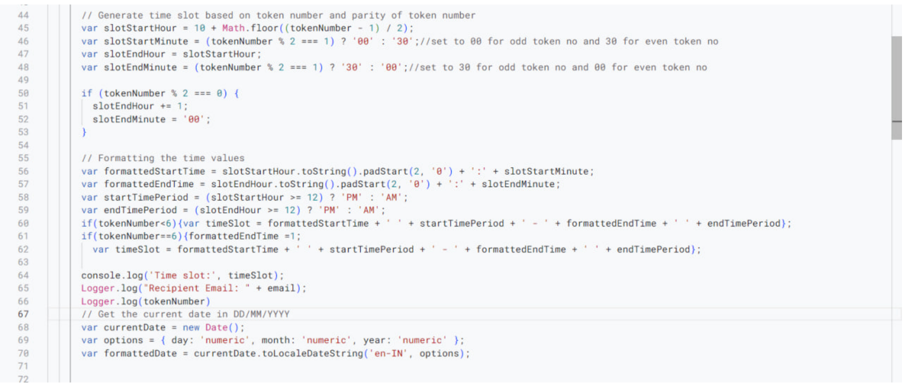
2.4.3 Generating Token Number



```

// Create an object to store the count of applicants for each location and subject
var locationQueue = {};

for (var i = 1; i < data.length; i++) {
  var row = data[i];
  var timestamp = row[0];
  var name = row[1];
  var contact = row[3];
  var subjectfilled = row[4];
  var location = row[5];
  var email = row[2];

  // If the location is not in the locationQueue object, initialize it
  if (!locationQueue.hasOwnProperty(location)) {
    locationQueue[location] = {};
  }

  var locationData = locationQueue[location];

  // If the subject is not in the locationData object, initialize it
  if (!locationData.hasOwnProperty(subjectfilled)) {
    locationData[subjectfilled] = {
      count: 0,//initialize no of applicants to 0
      slots: 6//initial no of available slots for that particular location and subject
    };
  }

  var subjectData = locationData[subjectfilled];

  // Check if the current location and subject have available appointment slots
  if (subjectData.slots > 0) {
    // Increment the count for the current location and subject, and generate token number
    subjectData.count++;
    var tokenNumber = subjectData.count;

```

We make a separate queue for each subject at every location. The locationQueue object is used to store information about the count of applicants for each location and subject. The code checks if the current value of location variable is present as a property in the locationQueue object using the hasOwnProperty() method. If the location is not present, it initializes it by assigning an empty object to it to make sure that each unique location has an object to store its associated subject data.locationData object within locationQueue corresponding to the current location stores the subject data for that location.Similarly, the code checks if the current subjectfilled is present as a property in the locationData object. If not, it initializes it by assigning an object with properties count and slots to it. The count property is initially set to 0, representing the number of applicants for the subject, and the slots property is set to 6, representing the available appointment slots for that subject at the location.Then if there are available appointment slots (slots > 0) for the current location and subject, the code increments the count property of subjectData by 1, representing the number of applicants for that location and subject. This incremented value is then assigned to the tokenNumber variable, which represents the token number for the current applicant.[4]

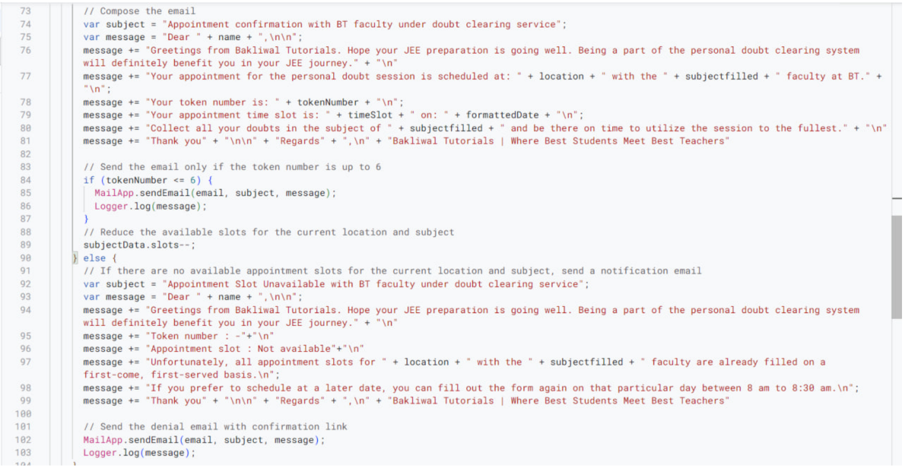
2.4.4 Assigning time slots according to token number



```
// Generate time slot based on token number and parity of token number
var slotStartHour = 10 + Math.floor((tokenNumber - 1) / 2);
var slotStartMinute = (tokenNumber % 2 === 1) ? '00' : '30';//set to 00 for odd token no and 30 for even token no
var slotEndHour = slotStartHour;
var slotEndMinute = (tokenNumber % 2 === 1) ? '30' : '00';//set to 30 for odd token no and 00 for even token no

if (tokenNumber % 2 === 0) {
  slotEndHour += 1;
  slotEndMinute = '00';
}

// Formatting the time values
var formattedStartTime = slotStartHour.toString().padStart(2, '0') + ':' + slotStartMinute;
var formattedEndTime = slotEndHour.toString().padStart(2, '0') + ':' + slotEndMinute;
var startTimePeriod = (slotStartHour >= 12) ? 'PM' : 'AM';
var endTimePeriod = (slotEndHour >= 12) ? 'PM' : 'AM';
if(tokenNumber<6){var timeSlot = formattedStartTime + ' ' + startTimePeriod + ' - ' + formattedEndTime + ' ' + endTimePeriod};
if(tokenNumber==6){formattedEndTime =1;
  var timeSlot = formattedStartTime + ' ' + startTimePeriod + ' - ' + formattedEndTime + ' ' + endTimePeriod};

console.log('Time slot:', timeSlot);
Logger.log("Recipient Email: " + email);
Logger.log(tokenNumber)
// Get the current date in DD/MM/YYYY
var currentDate = new Date();
var options = { day: 'numeric', month: 'numeric', year: 'numeric' };
var formattedDate = currentDate.toLocaleDateString('en-IN', options);
```

The variable slotStartHour is set to 10 plus the integer division (tokenNumber - 1) / 2. The slotStartMinute is set to ’00’ for odd tokenNumber and ’30’ for even tokenNumber.slotEndHour and slotEndMinute also adjusted according to parity of the token number. The code then formats the start and end time values by converting the hours and minutes to strings and padding them with leading zeros if needed. The startTimePeriod and endTimePeriod variables are used to determine whether the time slot is in the AM or PM period depending on the slotStartHour and slotEndHour.[6] The code also retrieves the current date using new Date(), and formats it to a localized string in the format ”day/month/year” using the toLocaleDateString() method.[5]

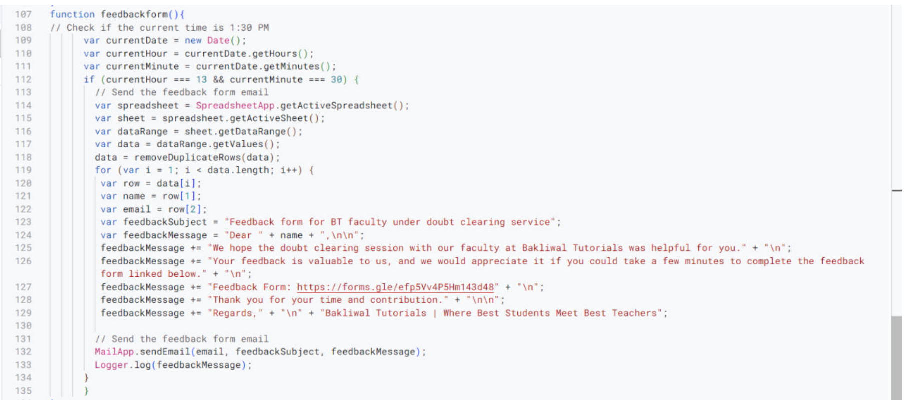
2.4.5 Sending Emails



```
 // Compose the email
 var subject = "Appointment confirmation with BT faculty under doubt clearing service";
 var message = "Dear " + name + ",\n\n";
 message += "Greetings from Bakliwal Tutorials. Hope your JEE preparation is going well. Being a part of the personal doubt clearing system will definitely benefit you in your JEE journey." + "\n"
 message += "Your appointment for the personal doubt session is scheduled at: " + location + " with the " + subjectfilled + " faculty at BT." + "\n";
 message += "Your token number is: " + tokenNumber + "\n";
 message += "Your appointment time slot is: " + timeSlot + " on: " + formattedDate + "\n";
 message += "Collect all your doubts in the subject of " + subjectfilled + " and be there on time to utilize the session to the fullest." + "\n"
 message += "Thank you" + "\n\n" + "Regards" + ",\n" + "Bakliwal Tutorials | Where Best Students Meet Best Teachers"

 // Send the email only if the token number is up to 6
 if (tokenNumber <= 6) {
   MailApp.sendEmail(email, subject, message);
   Logger.log(message);
 }
 // Reduce the available slots for the current location and subject
 subjectData.slots--;
} else {
 // If there are no available appointment slots for the current location and subject, send a notification email
 var subject = "Appointment Slot Unavailable with BT faculty under doubt clearing service";
 var message = "Dear " + name + ",\n\n";
 message += "Greetings from Bakliwal Tutorials. Hope your JEE preparation is going well. Being a part of the personal doubt clearing system will definitely benefit you in your JEE journey." + "\n"
 message += "Token number : -"+"\n"
 message += "Appointment slot : Not available"+"\n"
 message += "Unfortunately, all appointment slots for " + location + " with the " + subjectfilled + " faculty are already filled on a first-come, first-served basis.\n";
 message += "If you prefer to schedule at a later date, you can fill out the form again on that particular day between 8 am to 8:30 am.\n";
 message += "Thank you" + "\n\n" + "Regards" + ",\n" + "Bakliwal Tutorials | Where Best Students Meet Best Teachers"

 // Send the denial email with confirmation link
 MailApp.sendEmail(email, subject, message);
 Logger.log(message);
```

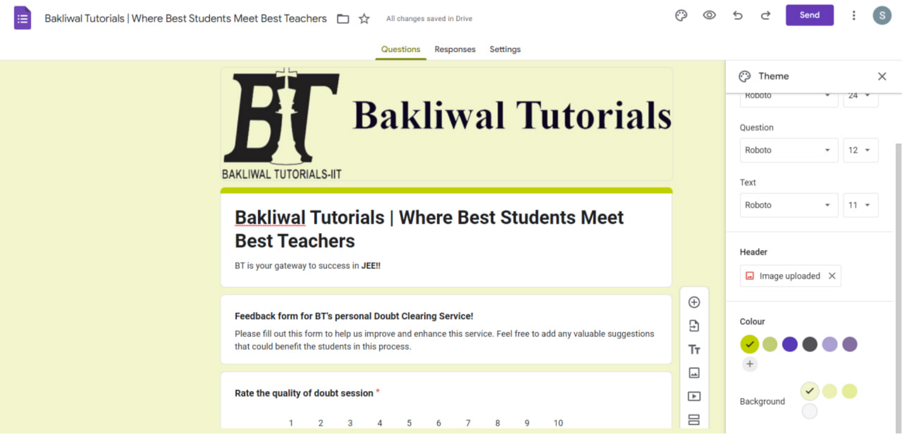
Two different mails are generated according to the condition whether token number is <= 6. The mails are sent at 8:30 am when the script is run.[3]

2.4.6 Feedback Form feature



```
function feedbackform(){
// Check if the current time is 1:30 PM
      var currentDate = new Date();
      var currentHour = currentDate.getHours();
      var currentMinute = currentDate.getMinutes();
      if (currentHour === 13 && currentMinute === 30) {
        // Send the feedback form email
        var spreadsheet = SpreadsheetApp.getActiveSpreadsheet();
        var sheet = spreadsheet.getActiveSheet();
        var dataRange = sheet.getDataRange();
        var data = dataRange.getValues();
        data = removeDuplicateRows(data);
        for (var i = 1; i < data.length; i++) {
         var row = data[i];
         var name = row[1];
         var email = row[2];
         var feedbackSubject = "Feedback form for BT faculty under doubt clearing service";
         var feedbackMessage = "Dear " + name + ",\n\n";
         feedbackMessage += "We hope the doubt clearing session with our faculty at Bakliwal Tutorials was helpful for you." + "\n";
         feedbackMessage += "Your feedback is valuable to us, and we would appreciate it if you could take a few minutes to complete the feedback form linked below." + "\n";
         feedbackMessage += "Feedback Form: https://forms.gle/efp5Vv4P5Hm143d48" + "\n";
         feedbackMessage += "Thank you for your time and contribution." + "\n\n";
         feedbackMessage += "Regards," + "\n" + "Bakliwal Tutorials | Where Best Students Meet Best Teachers";

        // Send the feedback form email
        MailApp.sendEmail(email, feedbackSubject, feedbackMessage);
        Logger.log(feedbackMessage);
      }
      }
```

Since last appointment ends at 1pm, a mail containing a feedback form is sent to all those students who had their appointment on that day at 1:30pm . For that a function is defined to check if current time is 13:30 in the 24 hour clock system of the device. A trigger is set up to make the sendFeedbackform function to run according to time-driven basis daily and the interval being 1pm - 2pm.[7]
Feedback form link: https://forms.gle/EpWetV3mukT9dzzs7



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BT is your gateway to success in **JEE!!**

Feedback form for BT's personal Doubt Clearing Service!

Please fill out this form to help us improve and enhance this service. Feel free to add any valuable suggestions that could benefit the students in this process.

Rate the quality of doubt session *

1 2 3 4 5 6 7 8 9 10

References

[1] https://stackoverflow.com/questions/56449822/how-to-store-data-in-array-using-for-loop-\in-google-apps-script-pass-array-by.

[2] https://stackoverflow.com/questions/48655614/google-scripts-delete-duplicates-from-select-\range-not-whole-sheet.

[3] https://spreadsheet.dev/send-an-email-for-every-row-in-a-google-sheet/.

[4] https://developers.google.com/sheets/api/guides/concepts.

[5] https://developers.google.com/google-ads/scripts/docs/features/dates.

[6] https://github.com/moment/luxon/issues/664.

[7] https://developers.google.com/apps-script/guides/triggers/installable.