

Network Programming

AWS Assignment -2

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Source Code : Server

```
#include <stdio.h>

#include <stdlib.h>

#include <string.h>

#include <errno.h>

#include <time.h>

#include <unistd.h>

#include <sys/types.h>

#include <arpa/inet.h>

#include <sys/socket.h>

#include <netinet/in.h>

#include<stdio.h>

#include<stdlib.h>

#include<sys/socket.h>

#include<netinet/in.h>

#include<string.h>

#include <arpa/inet.h>

#include <fcntl.h> // for open

#include <unistd.h> // for close

#include<pthread.h>

pthread_mutex_t lock = PTHREAD_MUTEX_INITIALIZER;

char data[1025];

void * socketThread(void *arg)

{

    int clintConnt = *((int *)arg);

    read(clintConnt, data, sizeof(data)-1);

    printf("server : one client sent me a message      and the message is -> %s \n",data);
```

```

printf("server : enter response message for client -> ");

// Send message to the client socket
pthread_mutex_lock(&lock);
scanf("%[^\n]*c", data);
pthread_mutex_unlock(&lock);
write(clintConnt, data, strlen(data));
printf("server: response message sent to the client\n");
printf("Exit socketThread \n");
close(clintConnt);
}

int main()
{
int sock = 0, clintConnt = 0;
struct sockaddr_in ipOfServer;
sock = socket(AF_INET, SOCK_STREAM, 0); // creating socket
memset(&ipOfServer, '0', sizeof(ipOfServer));
memset(data, '\0', sizeof(data));
ipOfServer.sin_family = AF_INET;
ipOfServer.sin_addr.s_addr=htonl(INADDR_ANY);
ipOfServer.sin_port = htons(2020);
bind(sock, (struct sockaddr*)&ipOfServer , sizeof(ipOfServer));
listen(sock , 3);
pthread_t tid[60];
int i=0;
printf("\nserver is Running.\n");
while(1)
{

```

```
clintConnt = accept(sock, (struct sockaddr*)NULL, NULL);  
pthread_create(&tid[i], NULL, socketThread, &clintConnt);  
i++;  
}  
return 0;  
}
```

Source Code: Client

```
#include <sys/socket.h>  
#include <sys/types.h>  
#include <netinet/in.h>  
#include <netdb.h>  
#include <stdio.h>  
#include <string.h>  
#include <stdlib.h>  
#include <unistd.h>  
#include <errno.h>  
#include <arpa/inet.h>  
int main()  
{  
    int CreateSocket = 0,n = 0;  
    char data[1024];  
    struct sockaddr_in ipOfServer;  
    memset(data, '0', sizeof(data));  
    if((CreateSocket = socket(AF_INET, SOCK_STREAM, 0))< 0)  
    {  
        printf("Socket not created \n");  
        return 1;}  
}
```

```
ipOfServer.sin_family = AF_INET;
ipOfServer.sin_port = htons(2020);
ipOfServer.sin_addr.s_addr = inet_addr("127.0.0.1");
if(connect(CreateSocket, (struct sockaddr *)&ipOfServer, sizeof(ipOfServer))<0)
{
    printf("Some Error occurred\n");
    return 1;
}
printf("client is running : Enter ur message for server-> ");
scanf("%[^\n]%*c", data);
write(CreateSocket, data, strlen(data));
memset(data, '\0', sizeof(data));
read(CreateSocket, data, sizeof(data)-1);
printf("message from server : %s\n", data);
return 0;
}
```

AWS Assignment - C Multithreaded Client-Server

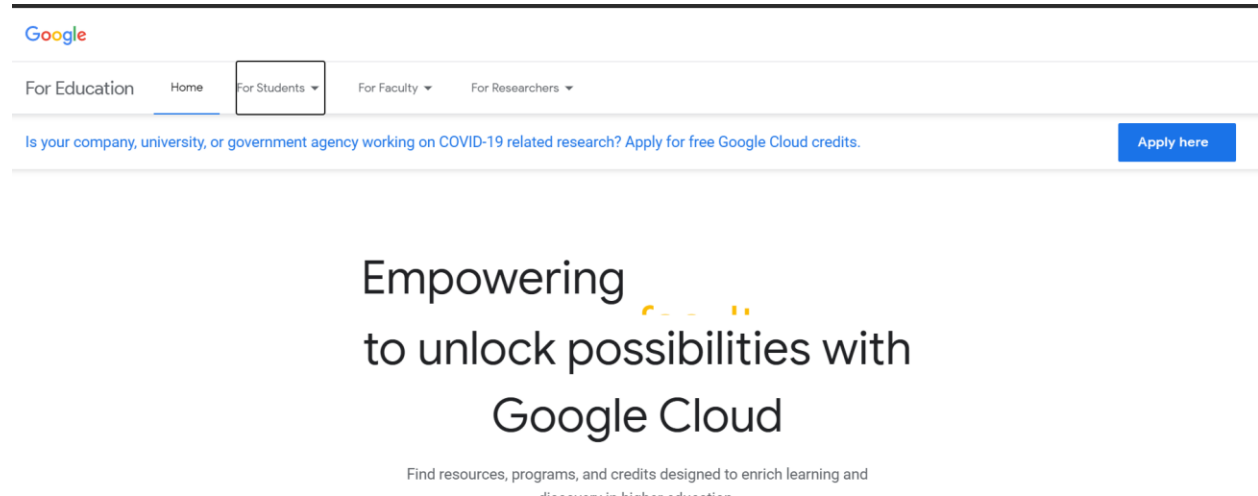
Implement multithreaded (using pthread library) client-server with TCP to allow multiple (2) clients to connect/interact with the server simultaneously.

Step 1: create an account on Google cloud

Problems in creating account on google cloud : it requires all of your information i.e your address and credit card details

Solution of Problem : As we are student google is providing free account for universities student just you have to provide small information and identity proof that you are college student (you can upload your images of your identity card)

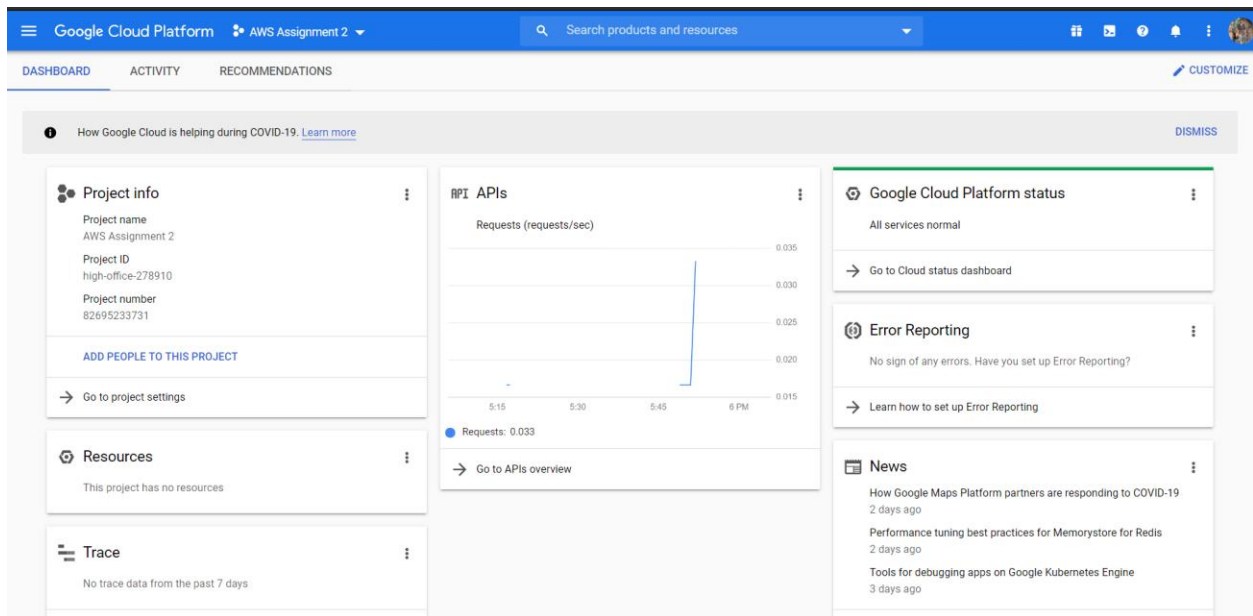
Type google cloud account for students you get this page



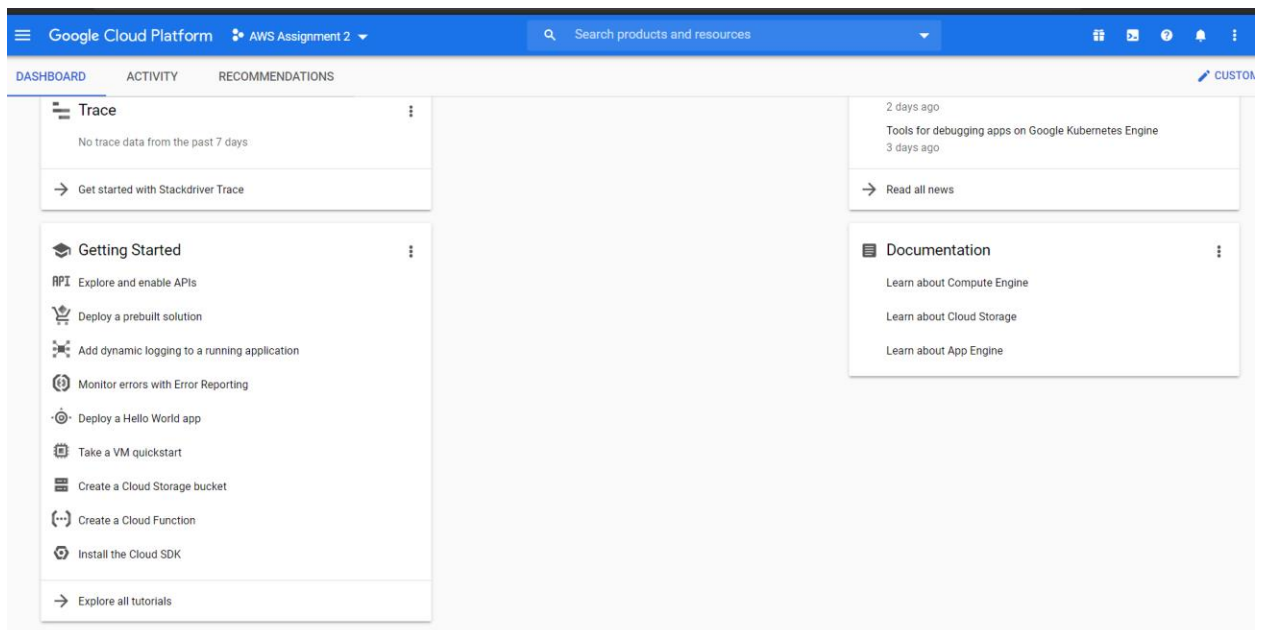
Select students benefit from it and fill your details and upload your photo of your identity card

After some times google verify your identity and now you can use google account free of cost without providing your card Details.

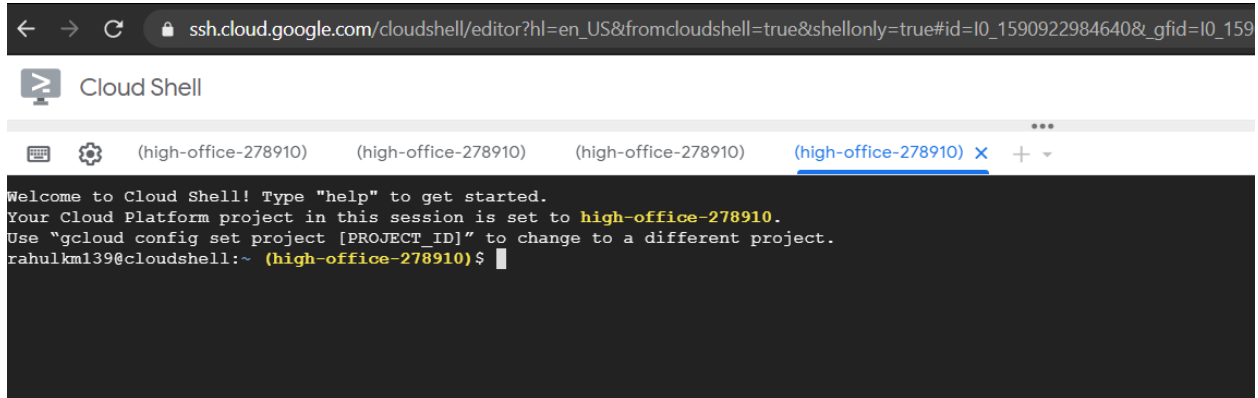
Step 2: now create your Project .



Step 3: Select Take a VM quickstart , it will create your virtual environment.

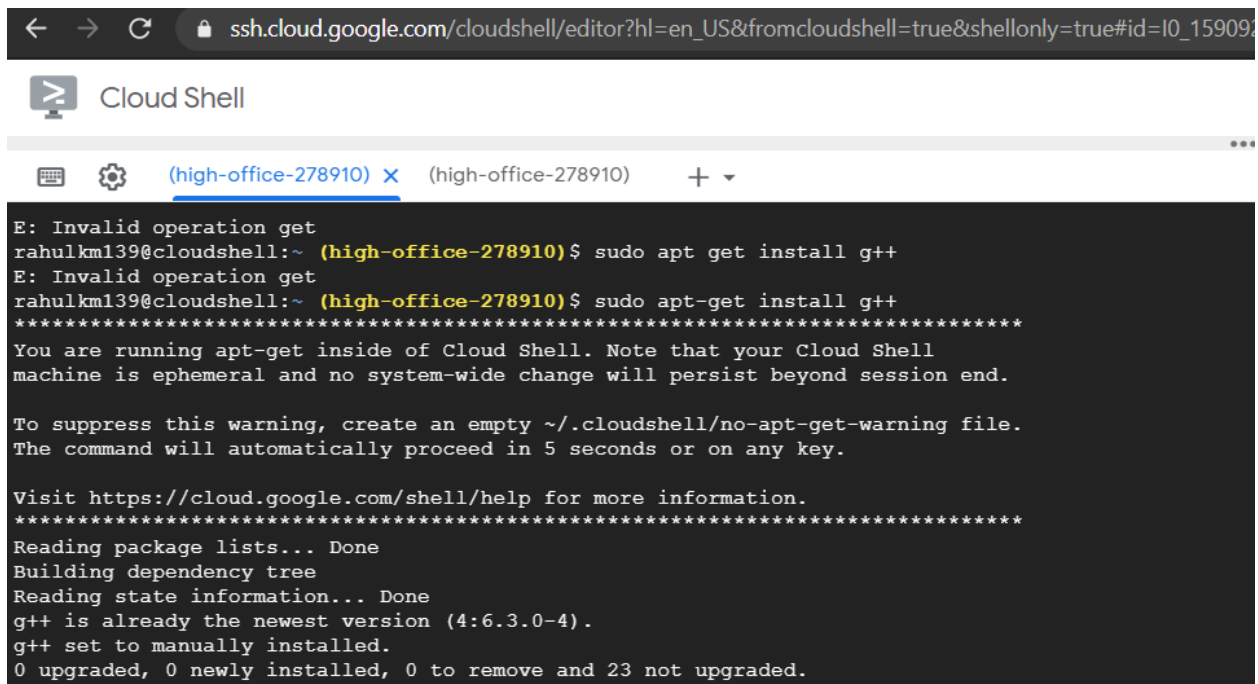


Step 4: Now cloud Shell opened



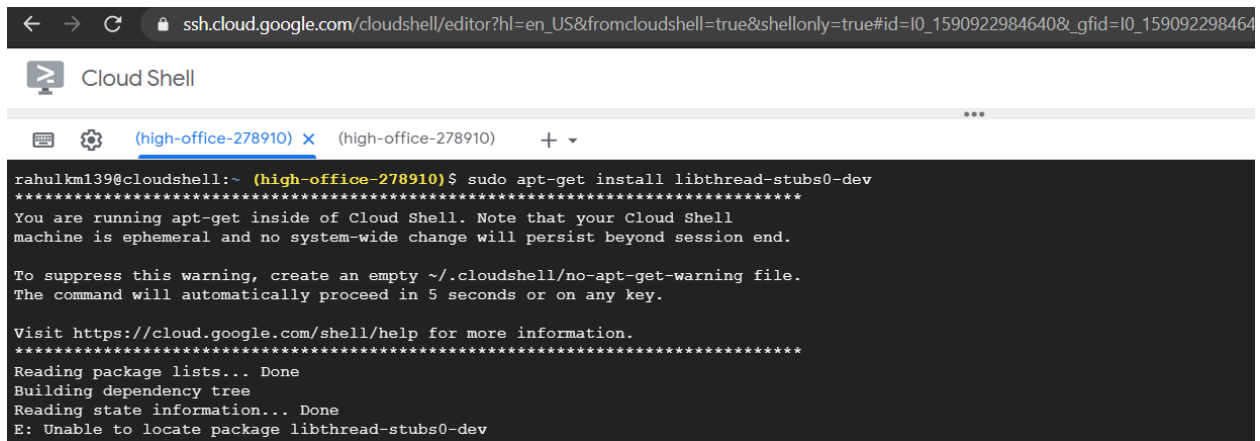
A screenshot of a web browser showing the Google Cloud Shell interface. The address bar displays the URL `ssh.cloud.google.com/cloudshell/editor?hl=en_US&fromcloudshell=true&shellonly=true#id=I0_1590922984640&_gfid=I0_1590922984640`. The page title is "Cloud Shell". Below the title, there are tabs for different projects, all labeled "(high-office-278910)". The main terminal area shows a welcome message: "Welcome to Cloud Shell! Type 'help' to get started. Your Cloud Platform project in this session is set to high-office-278910. Use 'gcloud config set project [PROJECT_ID]' to change to a different project." The prompt is `rahulkm139@cloudshell:~ (high-office-278910)$` with a cursor.

Step 5: install Git



A screenshot of the Google Cloud Shell terminal showing the installation of g++. The user enters `sudo apt get install g++`, which results in an "Invalid operation get" error. Then, the user enters `sudo apt-get install g++`, which also results in an "Invalid operation get" error. A warning message appears: "You are running apt-get inside of Cloud Shell. Note that your Cloud Shell machine is ephemeral and no system-wide change will persist beyond session end. To suppress this warning, create an empty ~/.cloudshell/no-apt-get-warning file. The command will automatically proceed in 5 seconds or on any key. Visit https://cloud.google.com/shell/help for more information." The terminal then shows the output of the command: "Reading package lists... Done", "Building dependency tree", "Reading state information... Done", "g++ is already the newest version (4:6.3.0-4).", "g++ set to manually installed.", and "0 upgraded, 0 newly installed, 0 to remove and 23 not upgraded."

Step 6: install pthread Library



```
ssh.cloud.google.com/cloudshell/editor?hl=en_US&fromcloudshell=true&shellonly=true#id=I0_1590922984640&_gfid=I0_1590922984640

Cloud Shell

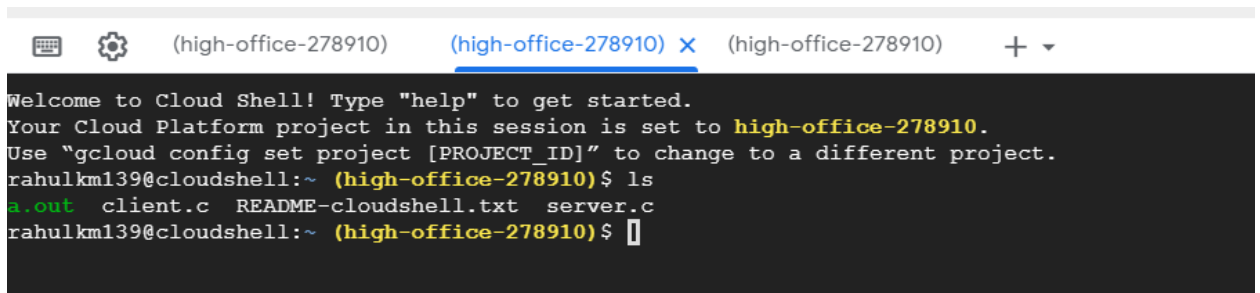
(high-office-278910) x (high-office-278910) + v

rahulkml39@cloudshell:~ (high-office-278910)$ sudo apt-get install libthread-stubs0-dev
*****
You are running apt-get inside of Cloud Shell. Note that your Cloud Shell
machine is ephemeral and no system-wide change will persist beyond session end.

To suppress this warning, create an empty ~/.cloudshell/no-apt-get-warning file.
The command will automatically proceed in 5 seconds or on any key.

Visit https://cloud.google.com/shell/help for more information.
*****
Reading package lists... Done
Building dependency tree
Reading state information... Done
E: Unable to locate package libthread-stubs0-dev
```

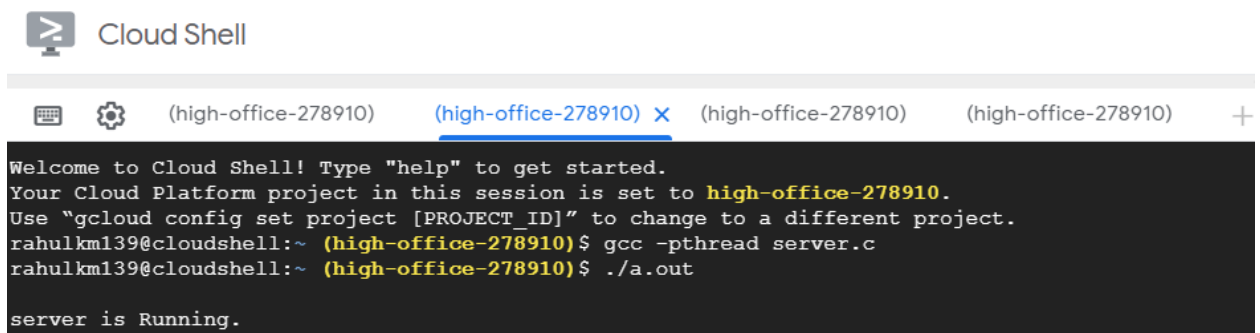
Step 7: Upload client program and server program



```
(high-office-278910) (high-office-278910) x (high-office-278910) + v

Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to high-office-278910.
Use "gcloud config set project [PROJECT_ID]" to change to a different project.
rahulkml39@cloudshell:~ (high-office-278910)$ ls
a.out client.c README-cloudshell.txt server.c
rahulkml39@cloudshell:~ (high-office-278910)$
```

Step 8: Run server program using gcc -pthread server.c



```
Cloud Shell

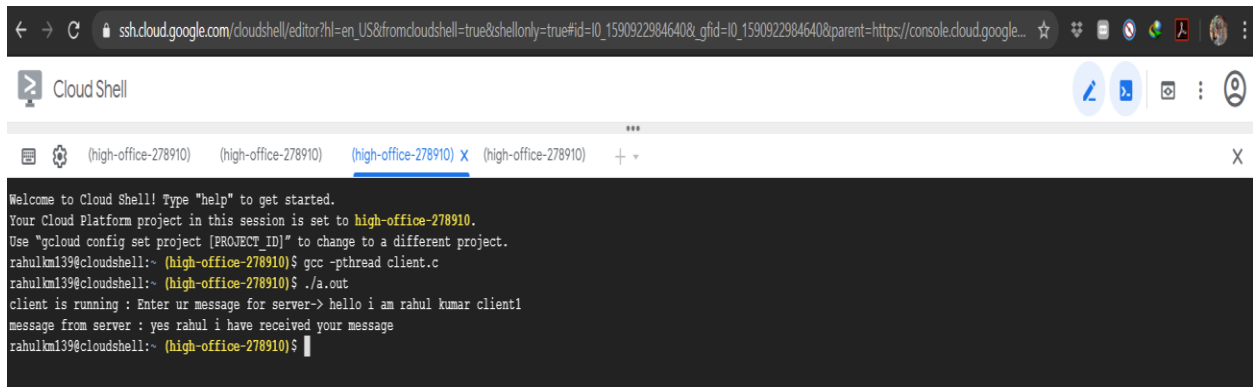
(high-office-278910) (high-office-278910) x (high-office-278910) (high-office-278910) +

Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to high-office-278910.
Use "gcloud config set project [PROJECT_ID]" to change to a different project.
rahulkml39@cloudshell:~ (high-office-278910)$ gcc -pthread server.c
rahulkml39@cloudshell:~ (high-office-278910)$ ./a.out

server is Running.
```

Step 9 : Create Multiple Client and make them communicate with server

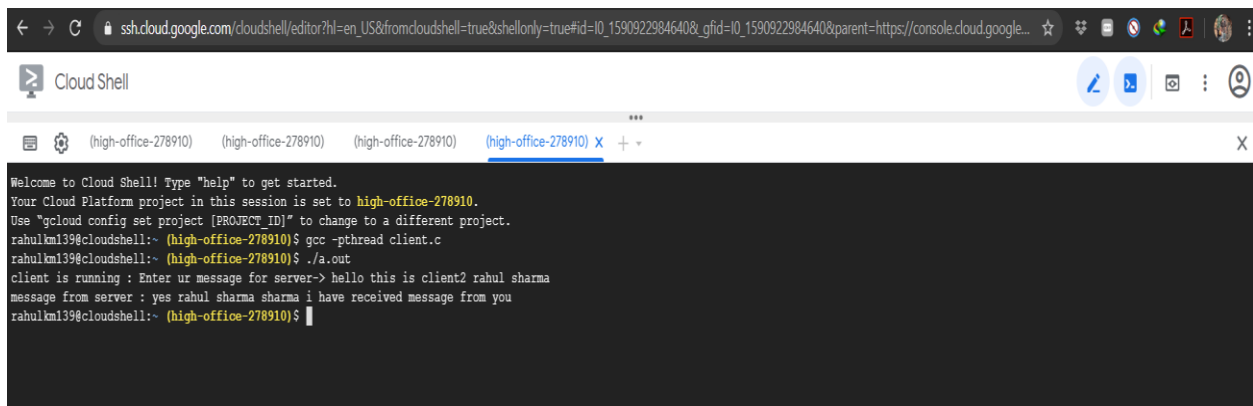
Client 1:



The screenshot shows a Cloud Shell terminal window with the URL `ssh.cloud.google.com/cloudshell/editor?hl=en_US&fromcloudshell=true&shellonly=true#id=10_1590922984640&_gfid=10_1590922984640&parent=https://console.cloud.google...`. The terminal displays the following output:

```
Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to high-office-278910.
Use "gcloud config set project [PROJECT_ID]" to change to a different project.
rahulkm139@cloudshell:~ (high-office-278910)$ gcc -pthread client.c
rahulkm139@cloudshell:~ (high-office-278910)$ ./a.out
client is running : Enter ur message for server-> hello i am rahul kumar client1
message from server : yes rahul i have received your message
rahulkm139@cloudshell:~ (high-office-278910)$
```

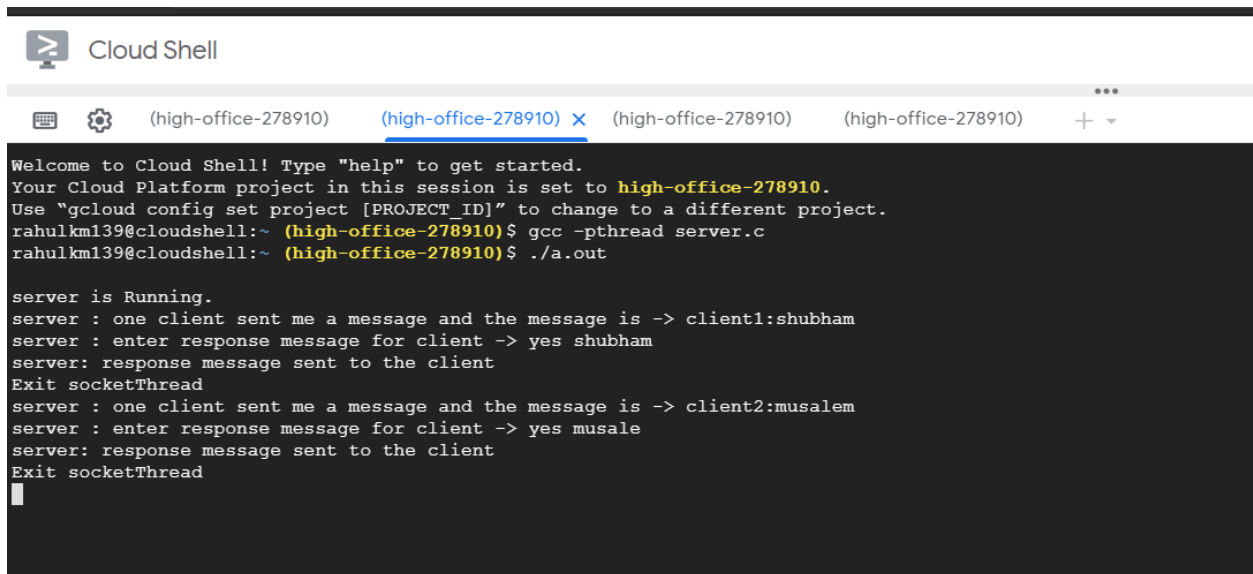
Client2:



The screenshot shows a Cloud Shell terminal window with the same URL as the previous one. The terminal displays the following output:

```
Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to high-office-278910.
Use "gcloud config set project [PROJECT_ID]" to change to a different project.
rahulkm139@cloudshell:~ (high-office-278910)$ gcc -pthread client.c
rahulkm139@cloudshell:~ (high-office-278910)$ ./a.out
client is running : Enter ur message for server-> hello this is client2 rahul sharma
message from server : yes rahul sharma sharma i have received message from you
rahulkm139@cloudshell:~ (high-office-278910)$
```

Step 11: Now Start communication with server and multiple client



```
Cloud Shell

(high-office-278910) (high-office-278910) X (high-office-278910) (high-office-278910) + -

Welcome to Cloud Shell! Type "help" to get started.
Your Cloud Platform project in this session is set to high-office-278910.
Use "gcloud config set project [PROJECT_ID]" to change to a different project.
rahulkm139@cloudshell:~ (high-office-278910) $ gcc -pthread server.c
rahulkm139@cloudshell:~ (high-office-278910) $ ./a.out

server is Running.
server : one client sent me a message and the message is -> client1:shubham
server : enter response message for client -> yes shubham
server: response message sent to the client
Exit socketThread
server : one client sent me a message and the message is -> client2:musalem
server : enter response message for client -> yes musale
server: response message sent to the client
Exit socketThread
```

Code Link : <https://github.com/rahulkmsharma/Aws2>