13/09/2021 **CN LAB 2** 2019103573

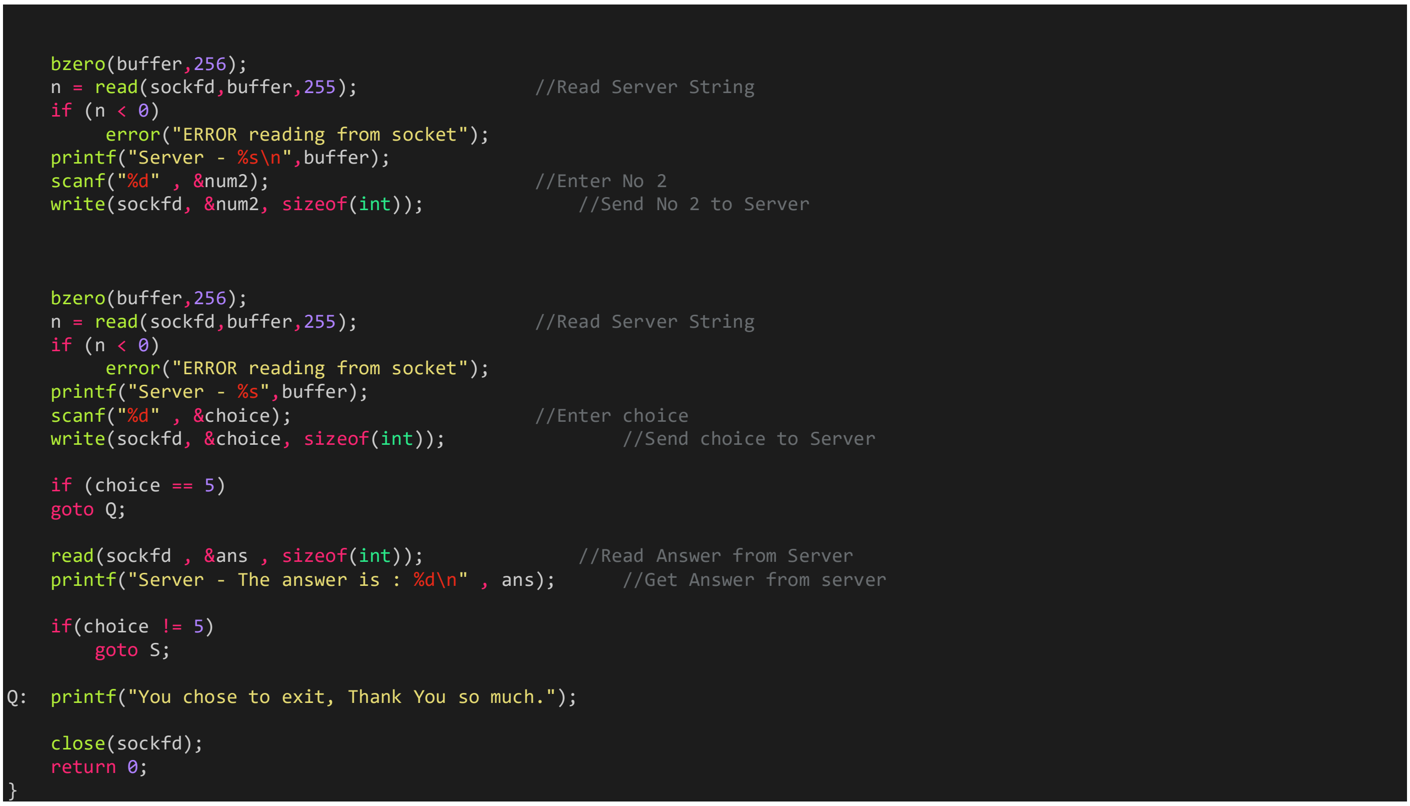
IMPLEMENTATION OF TCP APPLICATION WITH MATH CLIENT-SERVER

SERVER.C

```c
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <unistd.h>
#include <sys/types.h>
#include <sys/socket.h>
#include <netinet/in.h>
#include <ctype.h>
#include<time.h>

void error(const char *msg)
{
    perror(msg);
    exit(1);
}

int main(int argc, char *argv[])
{
     int sockfd, newsockfd, portno;
     socklen_t clilen;
     char buffer[1024];
     struct sockaddr_in serv_addr, cli_addr;
     int n;
     if (argc < 2) {
         fprintf(stderr,"ERROR, no port provided\n");
         exit(1);
     }
     sockfd = socket(AF_INET, SOCK_STREAM, 0);
     if (sockfd < 0)
        error("ERROR opening socket");

     bzero((char *) &serv_addr, sizeof(serv_addr));
     portno = atoi(argv[1]);
     serv_addr.sin_family = AF_INET;
     serv_addr.sin_addr.s_addr = INADDR_ANY;
     serv_addr.sin_port = htons(portno);
     if (bind(sockfd, (struct sockaddr *) &serv_addr,
              sizeof(serv_addr)) < 0)
              error("ERROR on binding");
     listen(sockfd,5);
     clilen = sizeof(cli_addr);
     newsockfd = accept(sockfd,
                 (struct sockaddr *) &cli_addr,
                 &clilen);
     if (newsockfd < 0)
          error("ERROR on accept");

     int num1 , num2 , ans , choice;
 S:  n = write(newsockfd,"Enter Number 1 : ",strlen("Enter Number 1"));
     if (n < 0) error("ERROR writing to socket");
     read(newsockfd, &num1, sizeof(int));
     printf("Client - Number 1 is : %d\n" , num1);


     n = write(newsockfd,"Enter Number 2 : ",strlen("Enter Number 2"));
     if (n < 0) error("ERROR writing to socket");
     read(newsockfd, &num2, sizeof(int));
     printf("Client - Number 2 is : %d\n" , num2);


     n = write(newsockfd,"Enter your choice : \n1.Addition\n2.Subtraction\n3.Multiplication\n4.Division\n5.Exit\n",strlen("Enter your choice : \n1.Addition\n2.Subtraction\n3.Multiplication\n4.Division\n5.Exit\n"));         //Ask for choice
     if (n < 0) error("ERROR writing to socket");
     read(newsockfd, &choice, sizeof(int));                  //Read choice
     printf("Client - Choice is : %d\n" , choice);


      switch(choice)
     {
        case 1:
            ans = num1 + num2;
            break;
        case 2:
            ans = num1 -num2;
            break;
        case 3:
            ans = num1*num2;
            break;
        case 4:
            ans = num1/num2;
            break;
        case 5 :
        goto Q;
            break;
     }
     printf("Answer : %d\n",ans);
     write(newsockfd , &ans , sizeof(int));
     if(choice != 5)
        goto S;

   Q:  close(newsockfd);
     close(sockfd);
     return 0;
}
```

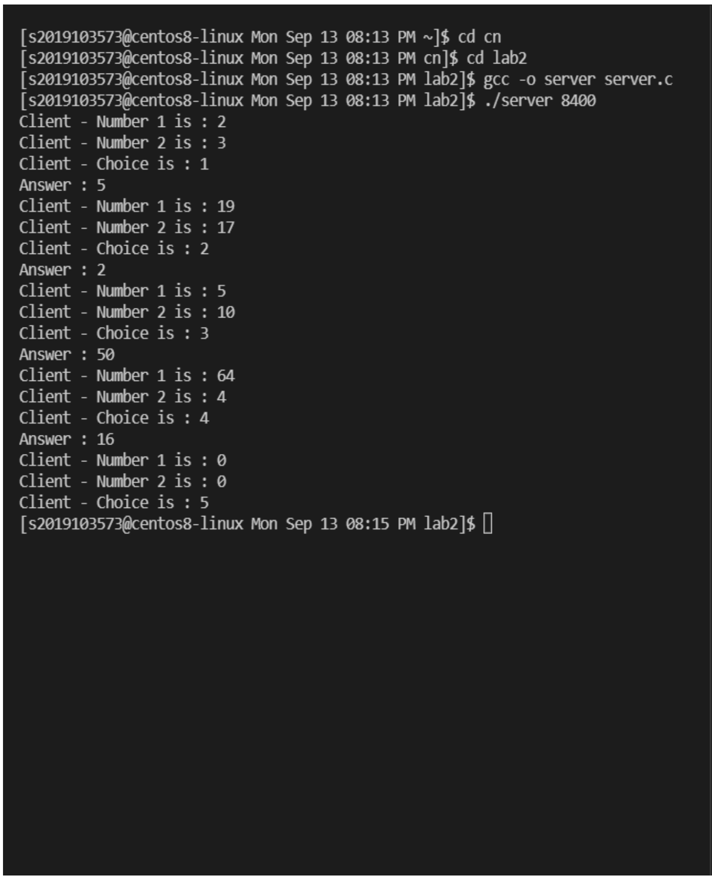
CLIENT.C

```
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <string.h>
#include <sys/types.h>
#include <sys/socket.h>
#include <netinet/in.h>
#include <netdb.h>
#include<ctype.h>
#include<time.h>

#define PORT 7787
#define MAXLINE 1024

void error(const char *msg)
{
    perror(msg);
    exit(0);
}

int main(int argc, char *argv[])
{
    int sockfd, portno, n;
    struct sockaddr_in serv_addr;
    struct hostent *server;

    char buffer[1024];
    if (argc < 3)
    {
       fprintf(stderr,"usage %s hostname port\n", argv[0]);
       exit(0);
    }
    portno = atoi(argv[2]);
    sockfd = socket(AF_INET, SOCK_STREAM, 0);
    if (sockfd < 0)
        error("ERROR opening socket");
    server = gethostbyname(argv[1]);
    if (server == NULL) {
        fprintf(stderr,"ERROR, no such host\n");
        exit(0);
    }
    bzero((char *) &serv_addr, sizeof(serv_addr));
    serv_addr.sin_family = AF_INET;
    bcopy((char *)server->h_addr,
         (char *)&serv_addr.sin_addr.s_addr,
         server->h_length);
    serv_addr.sin_port = htons(portno);
    if (connect(sockfd,(struct sockaddr *) &serv_addr,sizeof(serv_addr)) < 0)
        error("ERROR connecting");

    int num1 ;
    int num2 ;
    int ans;
    int choice;

  S:bzero(buffer,256);
    n = read(sockfd,buffer,255);                //Read Server String
    if (n < 0)
         error("ERROR reading from socket");
    printf("Server - %s\n",buffer);
    scanf("%d" , &num1);                        //Enter No 1
    write(sockfd, &num1, sizeof(int));              //Send No 1 to Server
```

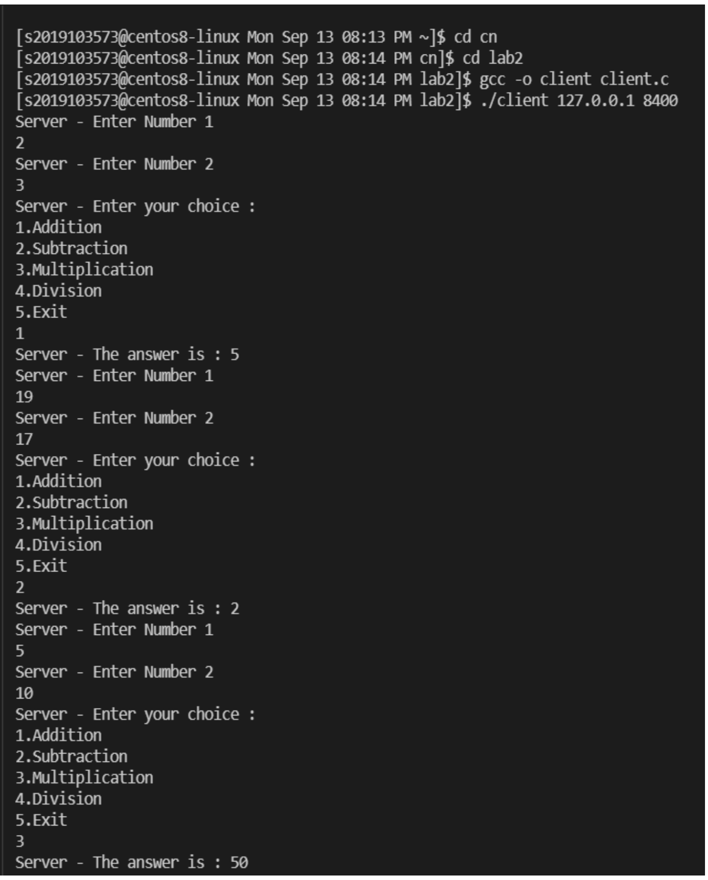


```

    bzero(buffer,256);
    n = read(sockfd,buffer,255);                //Read Server String
    if (n < 0)
         error("ERROR reading from socket");
    printf("Server - %s\n",buffer);
    scanf("%d" , &num2);                        //Enter No 2
    write(sockfd, &num2, sizeof(int));              //Send No 2 to Server



    bzero(buffer,256);
    n = read(sockfd,buffer,255);                //Read Server String
    if (n < 0)
         error("ERROR reading from socket");
    printf("Server - %s",buffer);
    scanf("%d" , &choice);                      //Enter choice
    write(sockfd, &choice, sizeof(int));                //Send choice to Server

    if (choice == 5)
    goto Q;

    read(sockfd , &ans , sizeof(int));              //Read Answer from Server
    printf("Server - The answer is : %d\n" , ans);      //Get Answer from server

    if(choice != 5)
        goto S;

Q:  printf("You chose to exit, Thank You so much.");

    close(sockfd);
    return 0;
}
```

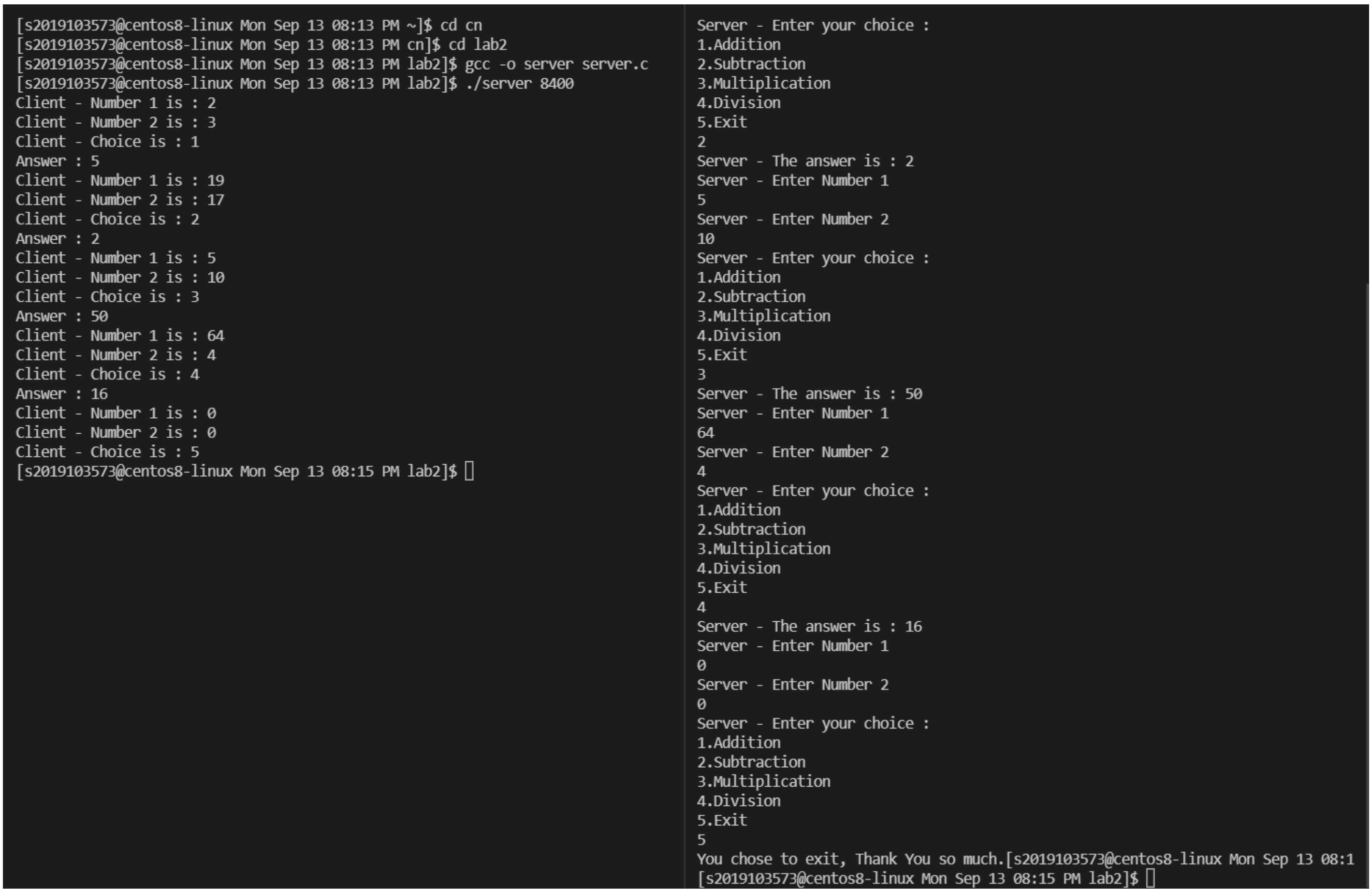
OUTPUT :



```
[s2019103573@centos8-linux Mon Sep 13 08:13 PM ~]$ cd cn
[s2019103573@centos8-linux Mon Sep 13 08:13 PM cn]$ cd lab2
[s2019103573@centos8-linux Mon Sep 13 08:13 PM lab2]$ gcc -o server server.c
[s2019103573@centos8-linux Mon Sep 13 08:13 PM lab2]$ ./server 8400
Client - Number 1 is : 2
Client - Number 2 is : 3
Client - Choice is : 1
Answer : 5
Client - Number 1 is : 19
Client - Number 2 is : 17
Client - Choice is : 2
Answer : 2
Client - Number 1 is : 5
Client - Number 2 is : 10
Client - Choice is : 3
Answer : 50
Client - Number 1 is : 64
Client - Number 2 is : 4
Client - Choice is : 4
Answer : 16
Client - Number 1 is : 0
Client - Number 2 is : 0
Client - Choice is : 5
[s2019103573@centos8-linux Mon Sep 13 08:15 PM lab2]$ 
```



```
[s2019103573@centos8-linux Mon Sep 13 08:13 PM ~]$ cd cn
[s2019103573@centos8-linux Mon Sep 13 08:14 PM cn]$ cd lab2
[s2019103573@centos8-linux Mon Sep 13 08:14 PM lab2]$ gcc -o client client.c
[s2019103573@centos8-linux Mon Sep 13 08:14 PM lab2]$ ./client 127.0.0.1 8400
Server - Enter Number 1
2
Server - Enter Number 2
3
Server - Enter your choice :
1.Addition
2.Subtraction
3.Multiplication
4.Division
5.Exit
1
Server - The answer is : 5
Server - Enter Number 1
19
Server - Enter Number 2
17
Server - Enter your choice :
1.Addition
2.Subtraction
3.Multiplication
4.Division
5.Exit
2
Server - The answer is : 2
Server - Enter Number 1
5
Server - Enter Number 2
10
Server - Enter your choice :
1.Addition
2.Subtraction
3.Multiplication
4.Division
5.Exit
3
Server - The answer is : 50
```



```
[s2019103573@centos8-linux Mon Sep 13 08:13 PM ~]$ cd cn
[s2019103573@centos8-linux Mon Sep 13 08:13 PM cn]$ cd lab2
[s2019103573@centos8-linux Mon Sep 13 08:13 PM lab2]$ gcc -o server server.c
[s2019103573@centos8-linux Mon Sep 13 08:13 PM lab2]$ ./server 8400
Client - Number 1 is : 2
Client - Number 2 is : 3
Client - Choice is : 1
Answer : 5
Client - Number 1 is : 19
Client - Number 2 is : 17
Client - Choice is : 2
Answer : 2
Client - Number 1 is : 5
Client - Number 2 is : 10
Client - Choice is : 3
Answer : 50
Client - Number 1 is : 64
Client - Number 2 is : 4
Client - Choice is : 4
Answer : 16
Client - Number 1 is : 0
Client - Number 2 is : 0
Client - Choice is : 5
[s2019103573@centos8-linux Mon Sep 13 08:15 PM lab2]$ 
```

```
Server - Enter your choice :
1.Addition
2.Subtraction
3.Multiplication
4.Division
5.Exit
2
Server - The answer is : 2
Server - Enter Number 1
5
Server - Enter Number 2
10
Server - Enter your choice :
1.Addition
2.Subtraction
3.Multiplication
4.Division
5.Exit
3
Server - The answer is : 50
Server - Enter Number 1
64
Server - Enter Number 2
4
Server - Enter your choice :
1.Addition
2.Subtraction
3.Multiplication
4.Division
5.Exit
4
Server - The answer is : 16
Server - Enter Number 1
0
Server - Enter Number 2
0
Server - Enter your choice :
1.Addition
2.Subtraction
3.Multiplication
4.Division
5.Exit
5
You chose to exit, Thank You so much.[s2019103573@centos8-linux Mon Sep 13 08:1
[s2019103573@centos8-linux Mon Sep 13 08:15 PM lab2]$ 
```