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# Section-4B
# OS LAB FINAL PROJECT

## Main file:

```
#include<iostream>

#include<string>

#include<unistd.h>

#include<stdlib.h>

#include<pthread.h>

#include <bits/stdc++.h>

#include<algorithm>

#include<string.h>

#include<sys/shm.h>

#include<stdio.h>

#include<queue>

using namespace std;

queue<int> wqueue;

queue<int> rqueue;

void showq(queue<int> wqueue)

{

   queue<int> g = wqueue;

   while (!g.empty()) {

      cout << '\t' << g.front();

      g.pop();

   }

   cout << '\n';

}
```

```
bool flag=true;
int i;
pthread_t thrTask[15];///thread pool for our 2o tasks
int n=15;//to keep the value up to which our loops have to operate
int *currentIDArr = new int [15];///creating ids for each process
//array for setting the priority for each process
int *currentPriorityArr = new int[15];
int IDPosition = 0;//process index track
int positionPriority = 0;//priority array index track
int RAM;//variable in which we store the ram that we will store the ram given by the user
int *shared_memory;
struct Task
{//struct for kepping the values that are to identify and stored each process
  int id;
  string name;
  int ramUse; //in MBs
  int priority; //Higher the number ,higher the  priority
};
Task t[15];

//the scheduling algorithm that we will be using for the process
void priorityScheduling(){
    for(int i=1;i<n;i++)
    {
     for(int j=1;j<n;j++)
      {
       if(t[i].priority > t[j].priority)//higher priority comes first
       {
        swap(t[i].id,t[j].id);
        swap(t[i].name,t[j].name);

        swap(t[i].ramUse,t[j].ramUse);

        swap(t[i].priority,t[j].priority);

       }

     }

    }

  }


  ///function for showing each process with all its properties

void showAll(){

            for(int i=0;i<n;i++) {

            cout<<t[i].id<<"\t"<<t[i].name<<"\t\t"<<t[i].ramUse<<"\t"<<t[i].priority<<endl;

   }

}


//function that we will use if a process is stoped and the next is choosen

//this is simply for contexting switching

int ContextSwitch(int ID, Task t[]){

            int pri;

///this checks basiclly if the process choosen by the user has a higher or lower priority than the process that is before it in the array.

            for(int i = 0;i<n;i++){

                        if(ID == t[i].id){

                                    pri = t[i].priority;

                                    break;

                        }

            }

            return pri;

}
```

```
void board()

{

cout<<"******************************************************************************************
**"<<endl;

  for(int i=0;i<9;i++)

  {

    cout<<"*\t\t\t\t\t\t\t\t\t\t\t*"<<endl;

  }

      cout<<"\t\t-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*"<<endl;

           cout<<"\t\t\tLoading operating system"<<endl;

           cout<<"\t\t-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*"<<endl;

  for(int i=0;i<9;i++)

  {

    cout<<"*\t\t\t\t\t\t\t\t\t\t\t*"<<endl;

  }

cout<<"******************************************************************************************
*"<<endl;

  sleep(5);

  system("clear");

cout<<"******************************************************************************************
*"<<endl;

  for(int i=0;i<9;i++)

  {

    cout<<"*\t\t\t\t\t\t\t\t\t\t\t*"<<endl;

  }

           cout<<"\t\t-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*"<<endl;

           cout << "\t\t\tWELCOME TO OS WORLD!"<<endl;

           cout<<"\t\t-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*"<<endl;

    for(int i=0;i<9;i++)

  {
    cout<<"*\t\t\t\t\t\t\t\t\t\t\t\t*"<<endl;

  }

cout<<"**************************************************************************
**"<<endl;

  sleep(5);

}

/////proccess1////////

/////calculator/////////

void *calculator(void *args)

{


sleep(5);

system("gnome-terminal -e  'sh -c \"g++ calculator.cpp && ./a.out\"'");


return  NULL;

}

/////proccess2////////

/////Tic Tac Toe/////////

void *tictactoe(void *args){

sleep(5);

 system("gnome-terminal -e  'sh -c \"g++ tictactoe.cpp && ./a.out\"'");




 return NULL;

}

/////proccess3////////

/////binarysearch/////////

void *binar_search(void *args){
```

```
sleep(5);
system("gnome-terminal -e  'sh -c \"g++ binarysearch.cpp && ./a.out\"'");

 return NULL;
}
/////proccess4////////
/////Banking System/////////
void *banking(void *args){

sleep(5);
system("gnome-terminal -e  'sh -c \"g++ banking.cpp && ./a.out\"'");

 return NULL;
}
/////proccess5////////
/////Guessing Game/////////
void *Guessing_game(void *args){
sleep(5);
system("gnome-terminal -e  'sh -c \"g++ guessgame.cpp && ./a.out\"'");

 return NULL;
}
/////proccess6////////
/////Message Box/////////
void *message(void *args){
sleep(5);
system("gnome-terminal -e  'sh -c \"g++ messagebox.cpp && ./a.out\"'");
 return NULL;
}
```

```
/////proccess7////////
/////Create File/////////
void *createfile(void *args){


sleep(5);
system("gnome-terminal -e  'sh -c \"g++ createfile.cpp && ./a.out\"'");


return  NULL;
}
/////proccess8////////
/////Delete File/////////
void *delete_file(void *args){


 sleep(5);
system("gnome-terminal -e  'sh -c \"g++ deletefile.cpp && ./a.out\"'");


 return NULL;
}
/////proccess9////////
/////calender/////////
void *calender(void *args){


sleep(5);
system("gnome-terminal -e  'sh -c \"g++ calender.cpp && ./a.out\"'");


return  NULL;
}


/////proccess10////////
```

```
/////time/////////
void *factorial(void *args){


sleep(5);
system("gnome-terminal -e  'sh -c \"g++ factorial.cpp && ./a.out\"'");


 return NULL;
}
/////proccess11////////
/////time/////////
void *time(void *args){


sleep(5);
system("gnome-terminal -e  'sh -c \"g++ time.cpp && ./a.out\"'");


 return NULL;
}
/////proccess12////////
/////Stop Watch/////////
void *stopwatch(void *args){


sleep(5);
system("gnome-terminal -e  'sh -c \"g++ stopwatch.cpp && ./a.out\"'");


 return NULL;
}
/////proccess13////////
/////Length of String/////////
void *length(void *args){
```

```
sleep(5);
system("gnome-terminal -e  'sh -c \"g++ stringlen.cpp && ./a.out\"'");


 return NULL;
}
/////proccess14////////
/////Find Prime/////////
void *prime(void *args){


sleep(5);
system("gnome-terminal -e  'sh -c \"g++ findprime.cpp && ./a.out\"'");


 return NULL;
}
/////proccess15////////
/////Hangman Game/////////
void *hangman_game(void *args){


sleep(5);
system("gnome-terminal -e  'sh -c \"g++ hangman.cpp && ./a.out\"'");


 return NULL;
}

///this function is used for telling which process or task with how much prority and ram useage is
runnig.
//////23///////
```

```
void *TaskManager(void *args){


cout << "ID\tName\t\tRam"<<endl;
        int ID;
        for(int i = 0; i< IDPosition-1;i++){
                ID = currentIDArr[i];
                cout << ID << "\t" << t[ID].name << "\t" << t[ID].ramUse<<endl;
        }
sleep(8);
 return NULL;
}
void userFunc()
{


        bool cond1=1;
        int choice1,pri;
        while(cond1)
        {
                system("clear");
                cout<<"\t-*-*-*-*-*-*-*-*-"<<"Total Ram is " << *shared_memory<<"*-*-*-*-*-*-*-*-*-
*-*-*"<<endl;
                cout<<"\t\t\t-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*"<<endl;
            cout << "\t\t\t\tMAIN MENU"<<endl;
            cout<<"\t\t\t-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*"<<endl;
                cout<<"1. Calculator.\n";
                cout<<"2. Tic Tac Toe.\n";
                cout<<"3. Binary Search\n";
                cout<<"4. Banking System \n";
                cout<<"5. Guessing Game.\n";
```

```
cout<<"6. Message Box.\n";
cout<<"7. Create file.\n";
cout<<"8. Delete file.\n";
cout<<"9. Calendar.\n";
cout<<"10. Time.\n";
cout<<"11. Find Factorial.\n";
cout<<"13. length of string.\n";
cout<<"14. Find Prime.\n";
cout<<"15. Hangman.\n";
cout<<"12. Stop Watch.\n";
cout<<"16.Shutdown.\n";
cout<<"Enter choice";
cin>>choice1;
if(t[choice1-1].ramUse>*shared_memory)
{
wqueue.push(t[choice1-1].id);
}
if( !wqueue.empty())
{
 int tempid=wqueue.front();
 wqueue.pop();
   for(i=0;i<15&&flag!=false;i++)
    {
       if(t[i].id==tempid)
       {
          flag=false;
      }


    }
```

```
       if(t[i].ramUse>=*shared_memory)
       {
         rqueue.push(tempid);

     currentIDArr[IDPosition] = t[choice1-1].id;
     IDPosition++;
if(RAM>t[choice1-1].ramUse)
 {
       RAM = RAM - t[choice1-1].ramUse;
       //add currnet position in arr
       currentPriorityArr[positionPriority] = t[choice1-1].priority;
       pri = ContextSwitch(choice1, t);
       if(pri > currentPriorityArr[positionPriority] )
       {
         RAM = RAM + 2;
       }
       positionPriority++;
     cout<<"-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*"<<endl;
     if( !rqueue.empty())
     {
       int tempid=rqueue.front();
       rqueue.pop();
       for(i=0;i<15&&flag!=false;i++)
       {
         if(t[i].id==tempid)
         {
           flag=false;
        }
}
flag=true;
if(t[i].name=="Calculator")
{
      cout<<"Opening the calculator"<<endl;
      pthread_create(&thrTask[0],NULL,&calculator,NULL);
      pthread_join(thrTask[0],NULL);
      cout<<"The process for calculaotr is executed"<<endl;
      RAM = RAM + t[i].ramUse;
      sleep(2);
}
else if(t[i].name=="TIC TAC TOE")
{
     cout<<"Opening the TIC TAC TOE"<<endl;
      pthread_create(&thrTask[1],NULL,&tictactoe,NULL);
      pthread_join(thrTask[1],NULL);
      cout<<"The process for tic tac toe is executed"<<endl;
      RAM = RAM + t[i].ramUse;
      sleep(2);
}
 else if(t[i].name=="Binary Search")
{
     cout<<"Opening the binary search"<<endl;
      pthread_create(&thrTask[2],NULL,&binar_search,NULL);
      pthread_join(thrTask[2],NULL);
      cout<<"The process for binary search is executed"<<endl;
      RAM = RAM + t[i].ramUse;
      sleep(2);
}
```

```
 else if(t[i].name=="Banking System")
{
    cout<<"Opening the banking "<<endl;
     pthread_create(&thrTask[3],NULL,&banking,NULL);
     pthread_join(thrTask[3],NULL);
     cout<<"The process for banking is executed"<<endl;
     RAM = RAM + t[i].ramUse;
     sleep(2);
}
 else if(t[i].name=="Guessing Game")
{
    cout<<"Opening the guessing game"<<endl;
     pthread_create(&thrTask[4],NULL,&Guessing_game,NULL);
     pthread_join(thrTask[4],NULL);
     cout<<"The process for guessing game is executed"<<endl;
     RAM = RAM + t[i].ramUse;
     sleep(2);
}
 else if(t[i].name=="Message Box")
{
    cout<<"Opening the message box"<<endl;
     pthread_create(&thrTask[5],NULL,&message,NULL);
     pthread_join(thrTask[5],NULL);
     cout<<"The process for message box is executed"<<endl;
     RAM = RAM + t[i].ramUse;
     sleep(2);
}
 else if(t[i].name=="Create File")
{
    cout<<"Opening the create file"<<endl;
     pthread_create(&thrTask[6],NULL,&createfile,NULL);
     pthread_join(thrTask[6],NULL);
     cout<<"The process for create file is executed"<<endl;
     RAM = RAM + t[i].ramUse;
     sleep(2);
}
 else if(t[i].name=="Delete File")
{
    cout<<"Opening the delete file"<<endl;
     pthread_create(&thrTask[7],NULL,&delete_file,NULL);
     pthread_join(thrTask[7],NULL);
     cout<<"The process for delete file is executed"<<endl;
     RAM = RAM + t[i].ramUse;
     sleep(2);
}
 else if(t[i].name=="Calender")
{
    cout<<"Opening the calender"<<endl;
     pthread_create(&thrTask[8],NULL,&calender,NULL);
     pthread_join(thrTask[8],NULL);
     cout<<"The process for calender is executed"<<endl;
     RAM = RAM + t[i].ramUse;
     sleep(2);
}
  else if(t[i].name=="Time Task")
{
    cout<<"Opening the clock"<<endl;
     pthread_create(&thrTask[9],NULL,&time,NULL);
```

```
      pthread_join(thrTask[9],NULL);

      cout<<"The process for clock is executed"<<endl;

      RAM = RAM + t[i].ramUse;

      sleep(2);

}

 else if(t[i].name=="Find Factorial")

{

     cout<<"Opening the find factorial proccess"<<endl;

      pthread_create(&thrTask[10],NULL,&factorial,NULL);

      pthread_join(thrTask[10],NULL);

      cout<<"The process for finding factorial is executed"<<endl;

      RAM = RAM + t[i].ramUse;

      sleep(2);

}

  else if(t[i].name=="String Length")

{

     cout<<"Opening the string length proccess"<<endl;

      pthread_create(&thrTask[11],NULL,&length,NULL);

      pthread_join(thrTask[11],NULL);

      cout<<"The process for find string length is executed"<<endl;

      RAM = RAM + t[i].ramUse;

      sleep(2);

}

  else if(t[i].name=="Find prime")

{

     cout<<"Opening the find prime proccess"<<endl;

      pthread_create(&thrTask[12],NULL,&prime,NULL);

      pthread_join(thrTask[12],NULL);

      cout<<"The process for finding prime is executed"<<endl;
```

```
             RAM = RAM + t[i].ramUse;
             sleep(2);
         }
          else if(t[i].name=="Hangman Task")
         {
            cout<<"Opening the hangman game"<<endl;
             pthread_create(&thrTask[13],NULL,&hangman_game,NULL);
             pthread_join(thrTask[13],NULL);
             cout<<"The process for hangman game is executed"<<endl;
             RAM = RAM + t[i].ramUse;
             sleep(2);
         }
          else if(t[i].name=="Stop Watch")
         {
            cout<<"Opening the stop watch"<<endl;
             pthread_create(&thrTask[14],NULL,&stopwatch,NULL);
             pthread_join(thrTask[14],NULL);
             cout<<"The process for stop watch is executed"<<endl;
             RAM = RAM + t[i].ramUse;
             sleep(2);
         }
      }
      }


}
}
else
{
          if(choice1==1)
```

```
       {
          cout<<"Opening the calculator"<<endl;
          pthread_create(&thrTask[0],NULL,&calculator,NULL);
          pthread_join(thrTask[0],NULL);
          cout<<"The process for calculaotr is executed"<<endl;
          RAM = RAM + t[choice1-1].ramUse;
          sleep(2);
 }
    else if(choice1==2)
      {
        cout<<"Opening TIC TAC TOE "<<endl;
        pthread_create(&thrTask[1],NULL,&tictactoe,NULL);
        pthread_join(thrTask[1],NULL);
        cout<<"The process for Tic tac toe is executed"<<endl;
        RAM = RAM + t[choice1-1].ramUse;
        sleep(2);
      }
  else if(choice1==3)
    {
       cout<<"Proccess for binary search is opening"<<endl;
       pthread_create(&thrTask[2],NULL,&binar_search,NULL);
       pthread_join(thrTask[2],NULL);
       cout<<"The process for binary search is executed"<<endl;
       RAM = RAM + t[choice1-1].ramUse;
       sleep(2);
    }
else if(choice1==4)
   {
      cout<<"opening banking system "<<endl;
      pthread_create(&thrTask[3],NULL,&banking,NULL);
      pthread_join(thrTask[3],NULL);
      cout<<"The process for banking system is executed"<<endl;
      RAM = RAM + t[choice1-1].ramUse;
      sleep(2);
   }
else if(choice1==5)
   {
      cout<<"Opening guessing game "<<endl;
      pthread_create(&thrTask[4],NULL,&Guessing_game,NULL);
      pthread_join(thrTask[4],NULL);
      cout<<"The proccess for guessing game is executed"<<endl;
      RAM = RAM + t[choice1-1].ramUse;
      sleep(2);
   }
else if(choice1==6)
   {
      cout<<"Opening Message Box"<<endl;
      pthread_create(&thrTask[5],NULL,&message,NULL);
      pthread_join(thrTask[5],NULL);
      cout<<"The proccess for Message Box is executed"<<endl;
      RAM = RAM + t[choice1-1].ramUse;
      sleep(2);
  }
else if(choice1==7)
  {
      cout<<"Opening create file"<<endl;
      pthread_create(&thrTask[6],NULL,&createfile,NULL);
      pthread_join(thrTask[6],NULL);
```

```
       cout<<"The proccess for creating file is executed"<<endl;
       RAM = RAM + t[choice1-1].ramUse;
       sleep(2);

  }
else if(choice1==8)
  {
       cout<<"Opening Delete file process"<<endl;
       pthread_create(&thrTask[7],NULL,&delete_file,NULL);
       pthread_join(thrTask[7],NULL);
       cout<<"The proccess for deleting file is executed"<<endl;
       RAM = RAM + t[choice1-1].ramUse;
       sleep(2);
  }
else if(choice1==9)
  {
       cout<<"Opening calender process"<<endl;
       pthread_create(&thrTask[8],NULL,&calender,NULL);
       pthread_join(thrTask[8],NULL);
       RAM = RAM + t[choice1-1].ramUse;
       sleep(2);
  }
   else if(choice1==10)
  {
       cout<<"clock opening..."<<endl;
       pthread_create(&thrTask[9],NULL,&time,NULL);
       pthread_join(thrTask[9],NULL);
       RAM = RAM + t[choice1-1].ramUse;
       sleep(2);
```

```
        }
else if(choice1==11)
        {
            cout<<"Factorial Proccess opening..."<<endl;
            pthread_create(&thrTask[10],NULL,&factorial,NULL);
            pthread_join(thrTask[10],NULL);
            RAM = RAM + t[choice1-1].ramUse;
            sleep(2);
        }
         else if(choice1==12)
        {
           cout<<"Length of string proccess opening..."<<endl;
           pthread_create(&thrTask[11],NULL,&length,NULL);
           pthread_join(thrTask[11],NULL);
           RAM = RAM + t[choice1-1].ramUse;
           sleep(2);
        }
         else if(choice1==13)
        {
            cout<<"Find Prime Proccess opening..."<<endl;
            pthread_create(&thrTask[12],NULL,&prime,NULL);
            pthread_join(thrTask[12],NULL);
            RAM = RAM + t[choice1-1].ramUse;
            sleep(2);
        }
          else if(choice1==14)
       {
           cout<<"Hangman game opening..."<<endl;
           pthread_create(&thrTask[13],NULL,&hangman_game,NULL);
```

```
                                 pthread_join(thrTask[13],NULL);

                                 RAM = RAM + t[choice1-1].ramUse;

                                 sleep(2);

                              }

                     else if(choice1==15)

                              {

                                  cout<<"Stop watch opening..."<<endl;

                                  pthread_create(&thrTask[14],NULL,&stopwatch,NULL);

                                  pthread_join(thrTask[14],NULL);

                                  RAM = RAM + t[choice1-1].ramUse;

                                  sleep(2);

                              }


                    else if(choice1==16)

                    {

                          cout<<"SHUTTING DOWN"<<endl;

                          sleep(5);

                          system("clear");

                          return;

                    }

                    else

                             {

                                 cout<<"Invalid task no!"<<endl;

                             }

              }

                  }

              }


void *initialize(void *args){
```

```
t[0].id=1; t[0].name="Calculator";
t[0].ramUse=10;t[0].priority=1;

t[1].id=2; t[1].name="TIC TAC TOE";
t[1].ramUse=30;t[1].priority=2;

t[2].id=3; t[2].name="Binary Search";
t[2].ramUse=40;t[2].priority=4;

t[3].id=4; t[3].name="Banking System";
t[3].ramUse=2; t[3].priority=3;

t[4].id=5; t[4].name="Guessing Game";
t[4].ramUse=2; t[4].priority=3;

t[5].id=6; t[5].name="Message Box";
t[5].ramUse=30;t[5].priority=6;

t[6].id=7; t[6].name="Create File";
t[6].ramUse=6; t[6].priority=8;

t[7].id=8; t[7].name="Delete File";
t[7].ramUse=3; t[7].priority=7;

t[8].id=9; t[8].name="Calender";
t[8].ramUse=10;t[8].priority=9;

t[9].id=10;t[9].name="Time Task";
```

```
  t[9].ramUse=30;t[9].priority=10;

  t[10].id=11;t[10].name="Find Factorial";
  t[10].ramUse=11;t[10].priority=11;

  t[11].id=12;t[11].name="String Length";
  t[11].ramUse=11;t[11].priority=12;

  t[12].id=13;t[12].name="Find prime";
  t[12].ramUse=20;t[12].priority=9;

  t[13].id=14;t[13].name="Hangman Task";
  t[13].ramUse=15;t[13].priority=19;

  t[14].id=15;t[14].name="Stop Watch";
  t[14].ramUse=11;t[14].priority=15;

   pthread_exit(NULL);
}
int main(int argc, char** num)
{
        string r = string(num[1]);
        RAM = stoi(r);
        string c = string(num[2]);
        int Cores = stoi(c);
        string d = string(num[3]);
        int Disk = stoi(d);
        bool cond1=1;
        int choice1;
```

```
                    pthread_t thr;
                    pthread_create(&thr,NULL,&initialize,NULL);  //loading tasks
                    pthread_join(thr,NULL);

          string pass;
          string kernalpass="1122";
          system("clear");



int shmid;
shmid=shmget((key_t)1122,sizeof(int),0666|IPC_CREAT);
shared_memory=(int*)shmat(shmid,NULL,0);
int data=RAM;

*shared_memory=data;
board();

          system("gnome-terminal -e  'sh -c \"g++ calender.cpp && ./a.out\"'");

          system("gnome-terminal -e  'sh -c \"g++ time.cpp && ./a.out\"'");

          system("clear");

          cout<<"\t\t-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*"<<endl;
          cout << "\t\t\tWELCOME TO LOGIN PAGE!"<<endl;
          cout<<"\t\t-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*"<<endl;
          cout<<"Welcome! How do you want to Log In? \nPlease Select from the following options:\n1.
User.\n2. Kernal.\nEnter the number of selected option:";
```

```
cin>>choice1;
system("clear");
switch(choice1)
{
        case 1:
                userFunc();
                break;
        case 2:
            Task t1[50];
            for(int i=0;i<24;++i)
            {
              t1[i].name=t[i].name;
              t1[i].priority=t[i].priority;
              t1[i].ramUse=t[i].ramUse;
            }

            t[50];
            for(int i=0;i<50;++i)
            {
              t[i].name="123";
            }

            for(int i=0;i<15;++i)
            {
              t[i].name=t1[i].name;
              t[i].priority=t1[i].priority;
              t[i].ramUse=t1[i].ramUse;
            }
```

```
    int count=15;
     cout<<"\t\t-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*"<<endl;
cout << "\t\t\tPLEASE ENTER PASSWORD TO LOGIN!"<<endl;
cout<<"\t\t-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*"<<endl;
    cout<<"Enter password of kernal: ";
    cin>>pass;
    if(pass=="1122")
    {
      cout<<"yahoo!!!password is correct:))\n";
    }
    while(pass!=kernalpass)
    {
       cout<<"Try again OR press 0 to shutdown"<<endl;
       cin>>pass;
       if(pass=="0")
         break;
    }
    int kChoice;
         do
         {

                              cout<<"1. To Add Task"<<endl;
                              cout<<"2. To Delete Task"<<endl;
                              cout<<"3. To Shutdown"<<endl;
                              cin>>kChoice;

                              if(kChoice == 1)
                              {
```

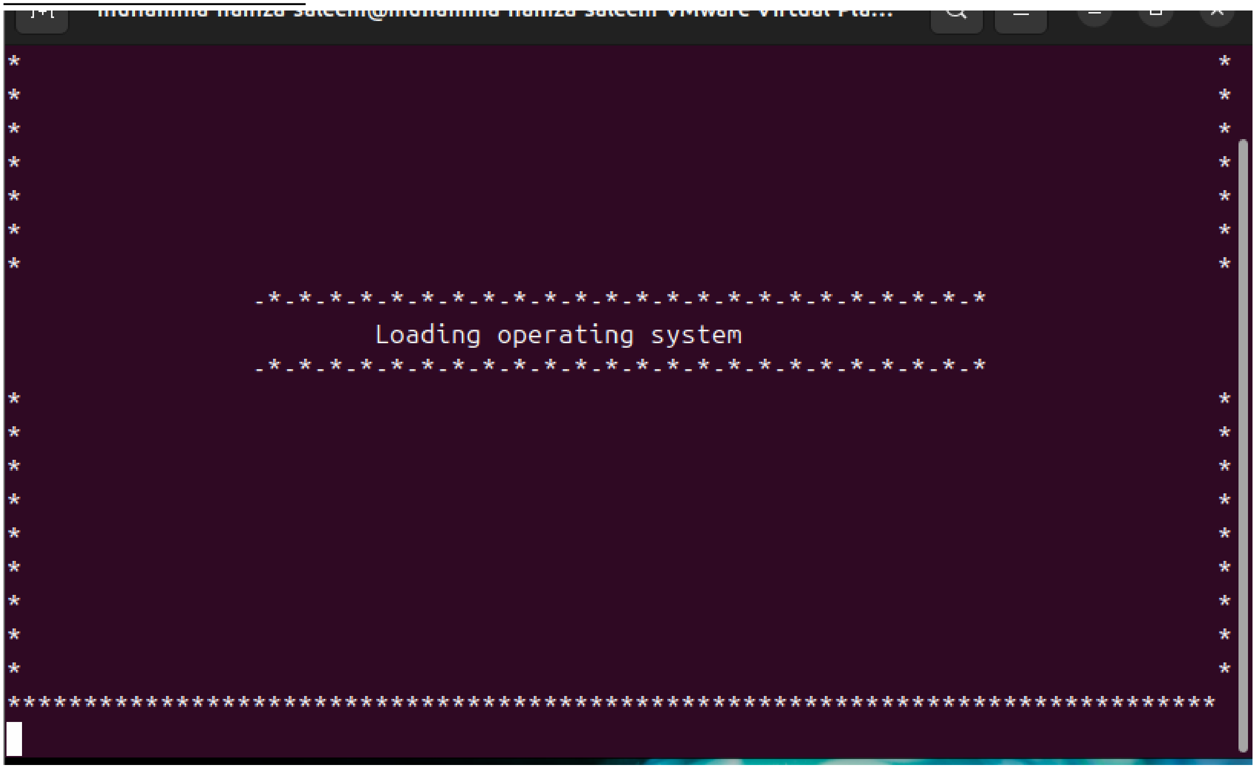
```
                                        cout<<"\t\t-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-
*"<<endl;
                          cout << "\t\t\tWELCOME TO THE PAGE TO ADD TASK!"<<endl;
                          cout<<"\t\t-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*"<<endl;
                                          for(int i = 0;i<50;i++)
                                          {
                                                 if(t[count].name!="")
                                                 {
                                                 cout<<"Enter the name of Task:";
                                                 cin>>t[count].name;
                                                 cout<<"Enter the Priority of Task:";
                                                 cin>>t[count].priority;
                                                 cout<<"Enter the Ram usage of Task:";
                                                 cin>>t[count].ramUse;
                                                 count++;
                                                 break;
                                                 }
                                          }//endFor
                                            cout<<"TOTAL TASK"<<endl;
                                          cout<<"Name\t\t\tPriority\t\t\tRAM"<<endl;
                                          for(int i=0;i<count;++i)
                                          {
                                             if(t[i].name!="")
                                             {

cout<<t[i].name<<"\t\t\t"<<t[i].priority<<"\t\t\t"<<t[i].ramUse<<endl;
                                             }
                                          }
                                            sleep(5);
```

```
                    }
                    else if(kChoice == 2)
                    {
                    string inp;
                    cout<<"\t\t-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-
*"<<endl;
             cout << "\t\t\tWELCOME TO THE PAGE TO DELETE TASK!"<<endl;
             cout<<"\t\t-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*"<<endl;
                    cout<<"Please enter the name of task you want to delete:";
                    cin>>inp;
                        for(int i = 0;i<50;i++)
                        {
                            if(inp==t[i].name)
                            {
                                t[i].name="";
                                t[i].id=0;
                                t[i].priority=0;
                                t[i].ramUse=0;
                                cout<<"Task deleted
succesfully"<<endl;
                                break;
                            }
                        }
                         cout<<"TOTAL TASK"<<endl;
                         cout<<endl;
                         cout<<"Name\t\t\tPriority\t\t\tRAM"<<endl;
                     for(int i=0;i<count;++i)
                     {
                      if(t[i].name!="")
```

```
                                                    {

cout<<t[i].name<<"\t\t\t"<<t[i].priority<<"\t\t\t"<<t[i].ramUse<<endl;
                                                    }
                                                  }
                                                  sleep(5);
                                                }

                              }while((kChoice==1)||(kChoice==2));
                              system("clear");
                              break;
        }
        return 0;
}
```

## Outputs:

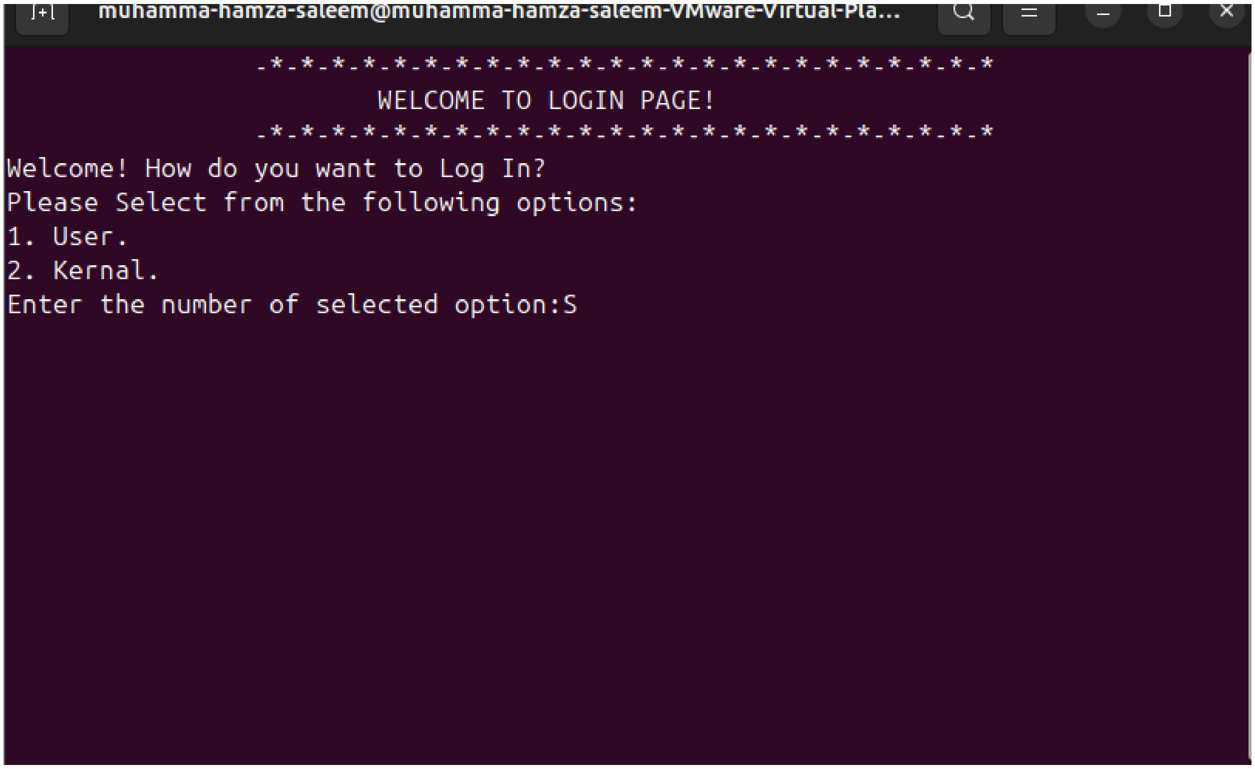
### 1.Welcome Screen:



muhammad hamza saleem@muhammad hamza saleem: VMware Virtual Pla...

```
*                                                                                      *
*                                                                                      *
*                                                                                      *
*                                                                                      *
*                                                                                      *
*                                                                                      *
*                                                                                      *
                  -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
                          Loading operating system
                  -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
*                                                                                      *
*                                                                                      *
*                                                                                      *
*                                                                                      *
*                                                                                      *
*                                                                                      *
*                                                                                      *
*                                                                                      *
*                                                                                      *
***************************************************************************************
█
```

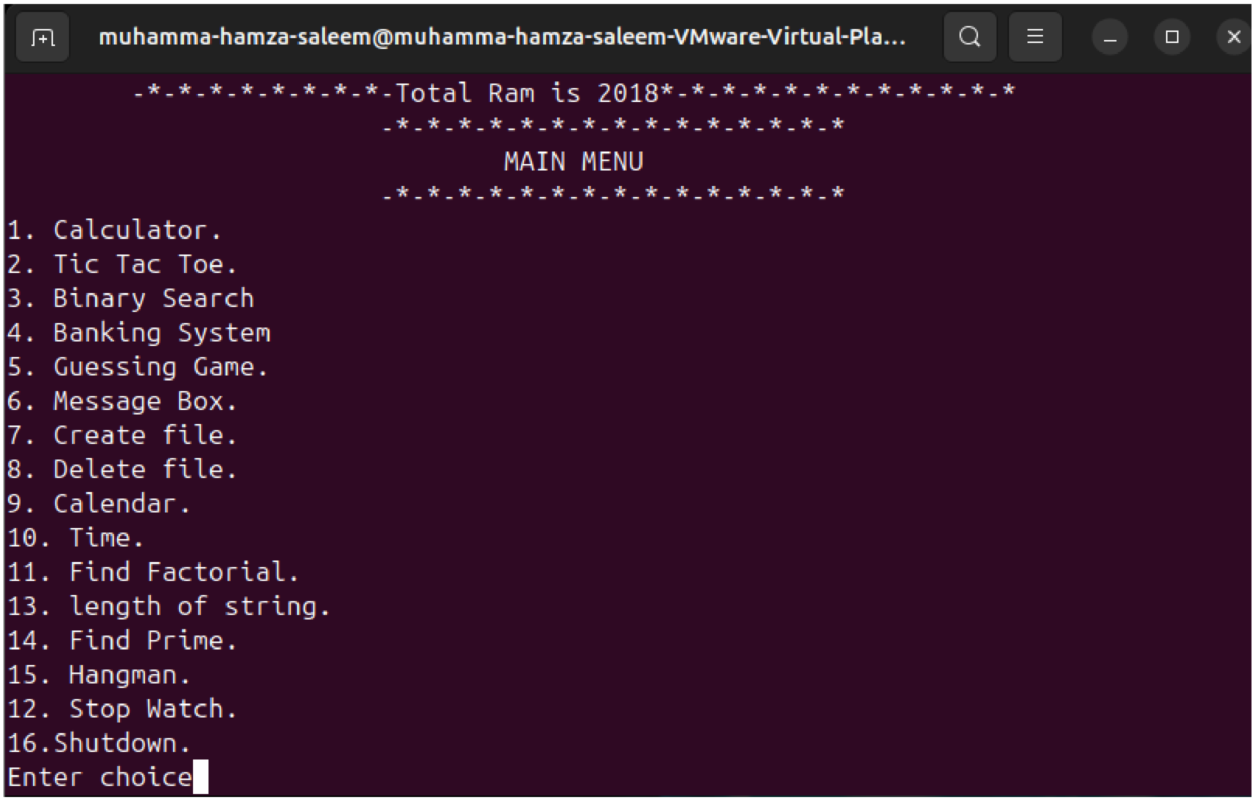
## 1.User Selection:



muhamma-hamza-saleem@muhamma-hamza-saleem-VMware-Virtual-Pla...

```
                 -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
                         WELCOME TO LOGIN PAGE!
                 -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
Welcome! How do you want to Log In?
Please Select from the following options:
1. User.
2. Kernal.
Enter the number of selected option:S
```

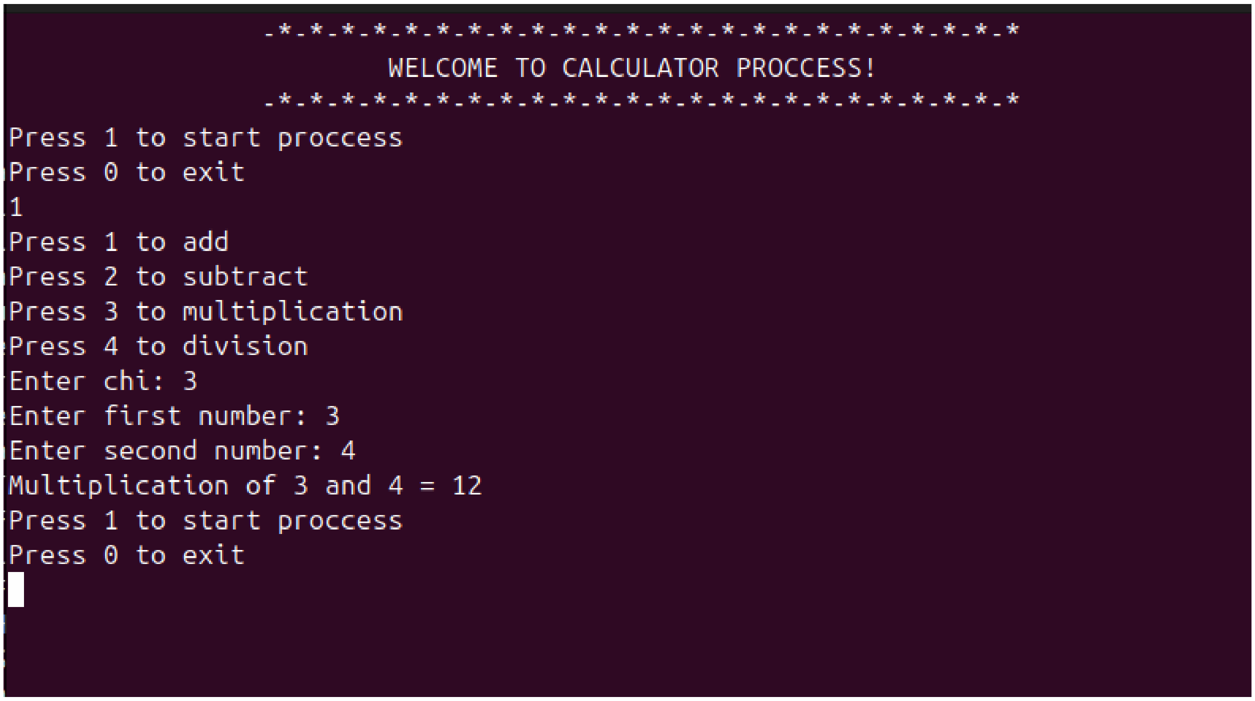
## 2.Main Menu



muhamma-hamza-saleem@muhamma-hamza-saleem-VMware-Virtual-Pla...

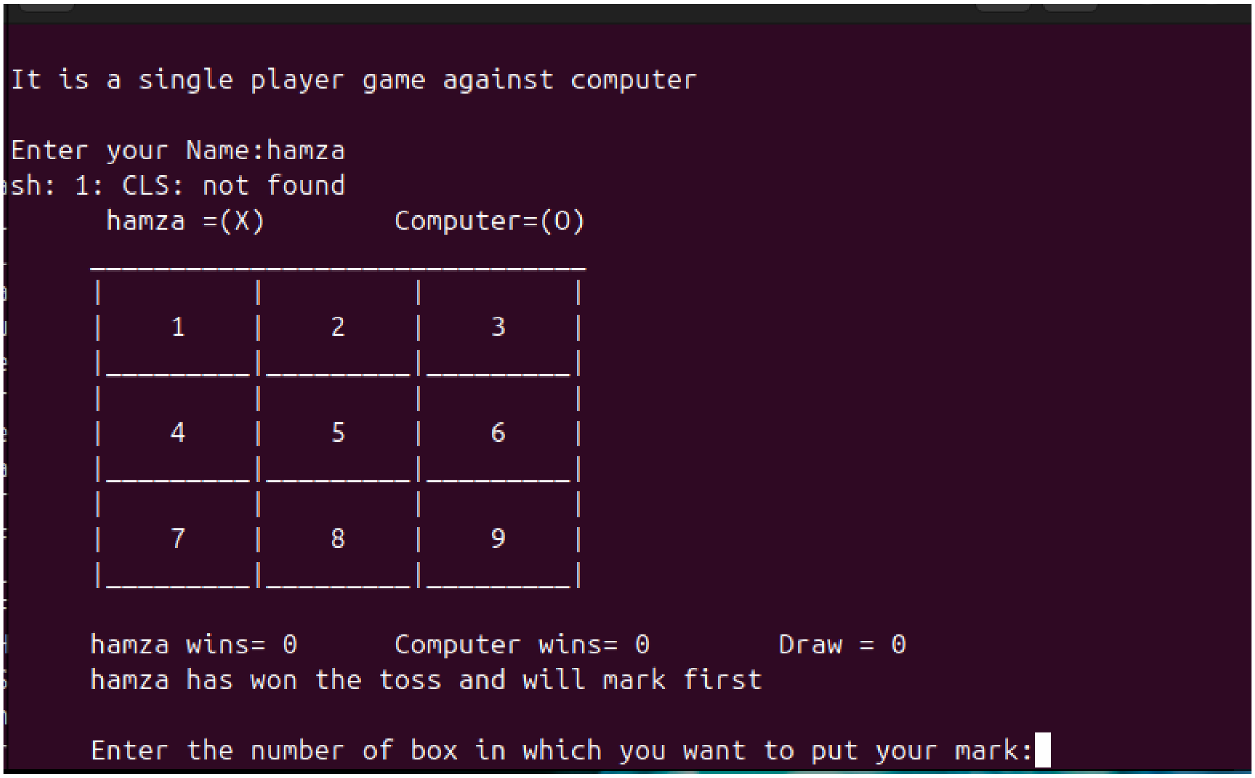
```
        -*-*-*-*-*-*-*-*-Total Ram is 2018*-*-*-*-*-*-*-*-*-*-*-*
                        -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
                               MAIN MENU
                        -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
1. Calculator.
2. Tic Tac Toe.
3. Binary Search
4. Banking System
5. Guessing Game.
6. Message Box.
7. Create file.
8. Delete file.
9. Calendar.
10. Time.
11. Find Factorial.
13. length of string.
14. Find Prime.
15. Hangman.
12. Stop Watch.
16.Shutdown.
Enter choice
```

## 3.Calculator:



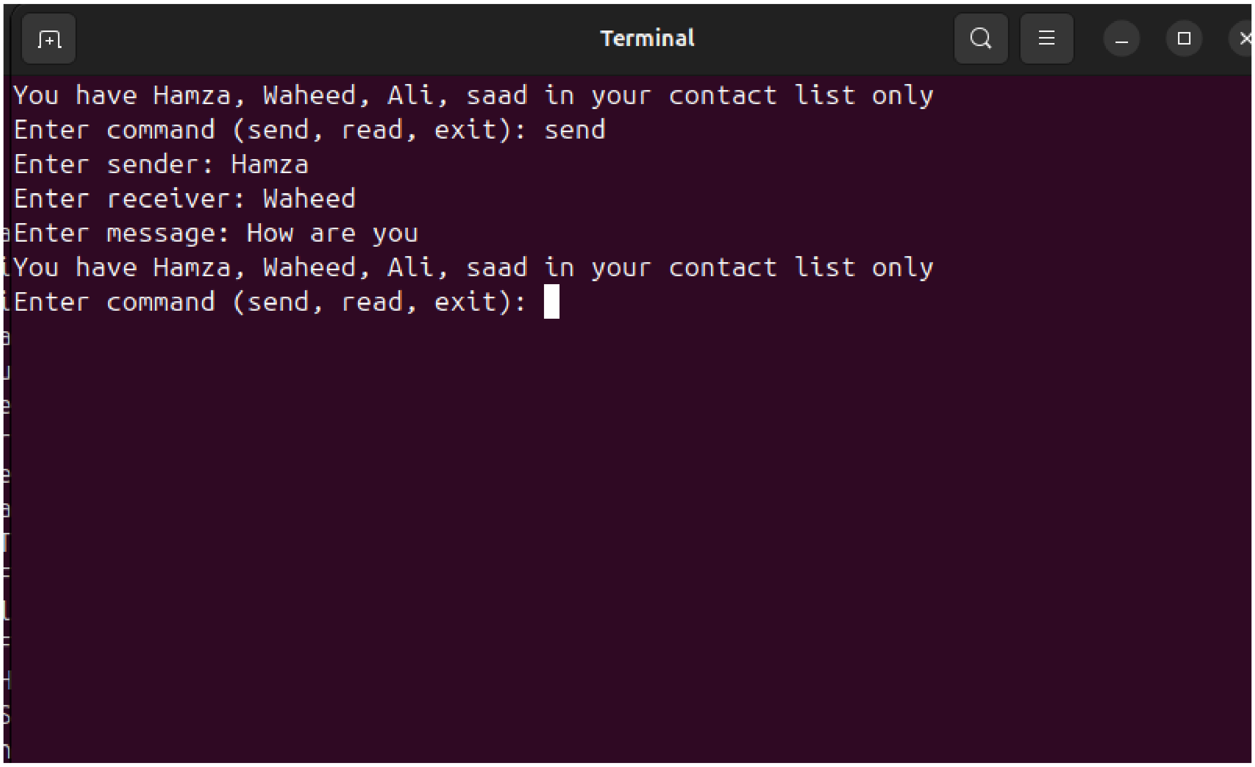
```
                -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
                        WELCOME TO CALCULATOR PROCCESS!
                -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
Press 1 to start proccess
Press 0 to exit
1
Press 1 to add
Press 2 to subtract
Press 3 to multiplication
Press 4 to division
Enter chi: 3
Enter first number: 3
Enter second number: 4
Multiplication of 3 and 4 = 12
Press 1 to start proccess
Press 0 to exit
```

## 4.TIC TAK TOE:

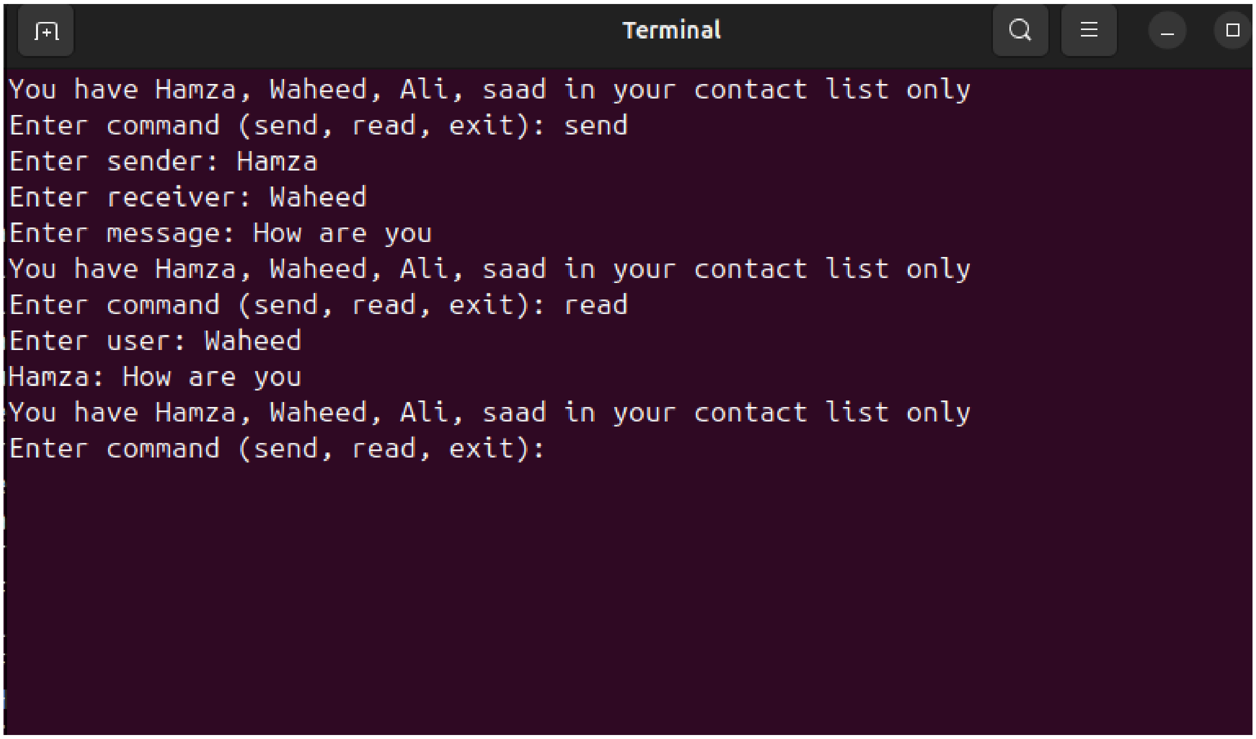


```
It is a single player game against computer

Enter your Name:hamza
sh: 1: CLS: not found
      hamza =(X)          Computer=(O)

     _______________________________
     |         |         |         |
     |    1    |    2    |    3    |
     |_________|_________|_________|
     |         |         |         |
     |    4    |    5    |    6    |
     |_________|_________|_________|
     |         |         |         |
     |    7    |    8    |    9    |
     |_________|_________|_________|

     hamza wins= 0       Computer wins= 0         Draw = 0
     hamza has won the toss and will mark first

     Enter the number of box in which you want to put your mark:
```

## 5.Message Passing

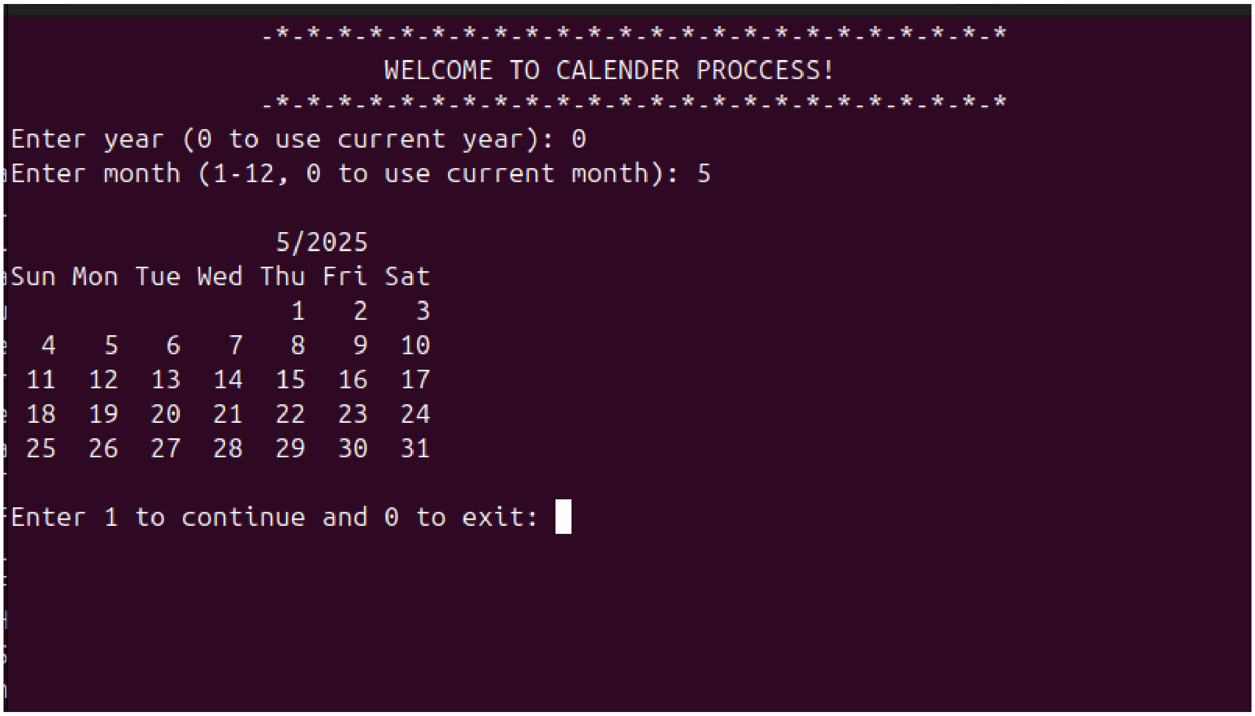


```
You have Hamza, Waheed, Ali, saad in your contact list only
Enter command (send, read, exit): send
Enter sender: Hamza
Enter receiver: Waheed
Enter message: How are you
You have Hamza, Waheed, Ali, saad in your contact list only
Enter command (send, read, exit):
```



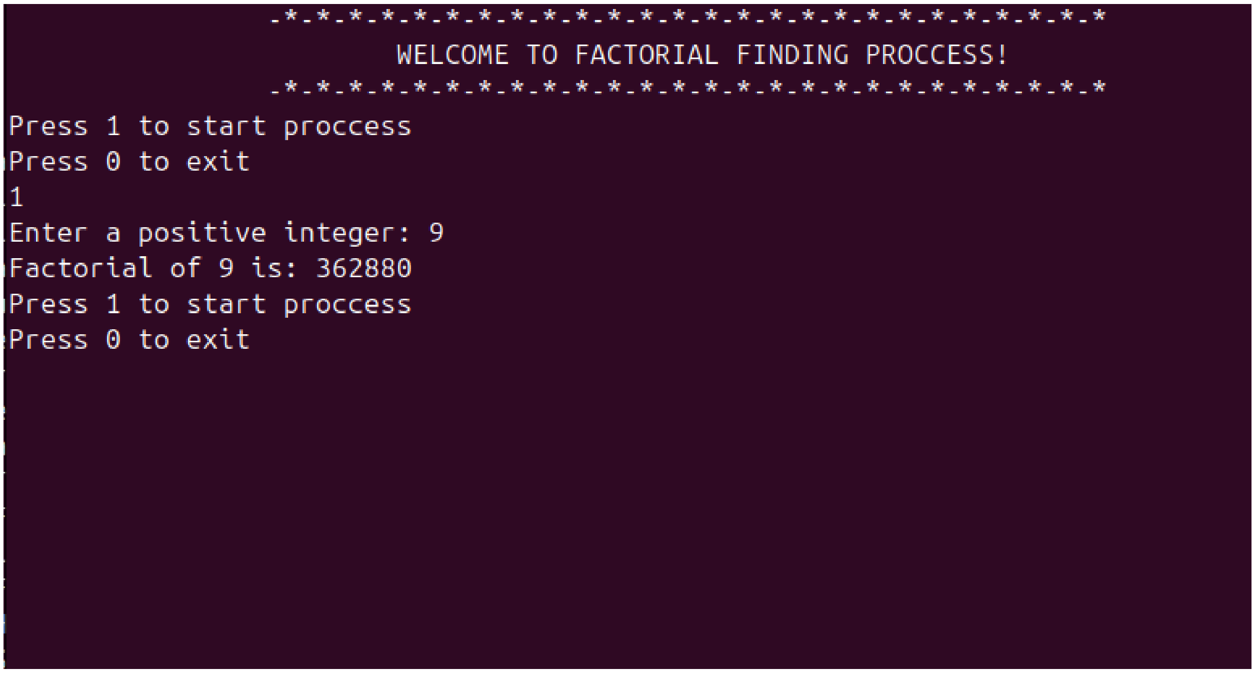
```
You have Hamza, Waheed, Ali, saad in your contact list only
Enter command (send, read, exit): send
Enter sender: Hamza
Enter receiver: Waheed
Enter message: How are you
You have Hamza, Waheed, Ali, saad in your contact list only
Enter command (send, read, exit): read
Enter user: Waheed
Hamza: How are you
You have Hamza, Waheed, Ali, saad in your contact list only
Enter command (send, read, exit):
```

## 6.Calendar:



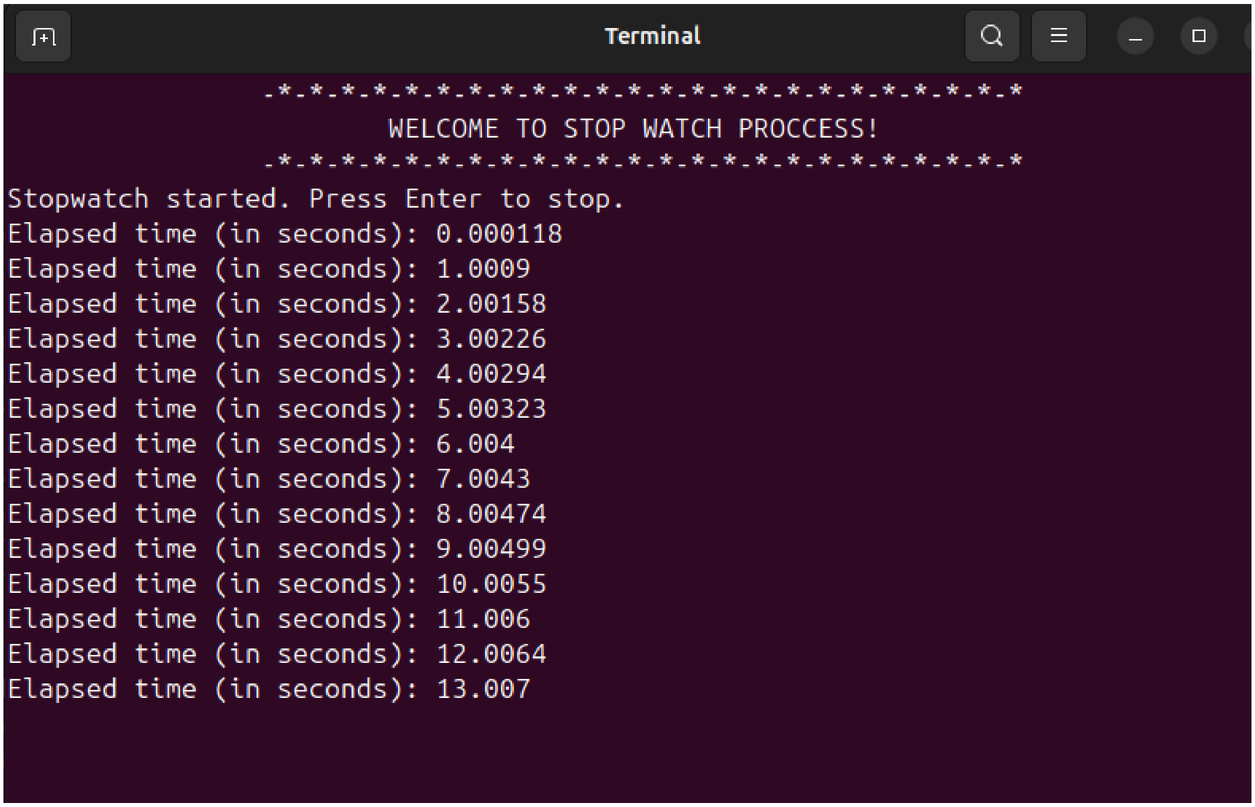
```
                _*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*
                        WELCOME TO CALENDER PROCCESS!
                _*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*
Enter year (0 to use current year): 0
Enter month (1-12, 0 to use current month): 5

                 5/2025
Sun Mon Tue Wed Thu Fri Sat
                  1   2   3
  4   5   6   7   8   9  10
 11  12  13  14  15  16  17
 18  19  20  21  22  23  24
 25  26  27  28  29  30  31

Enter 1 to continue and 0 to exit: 
```

## 7.Factorial Finding:



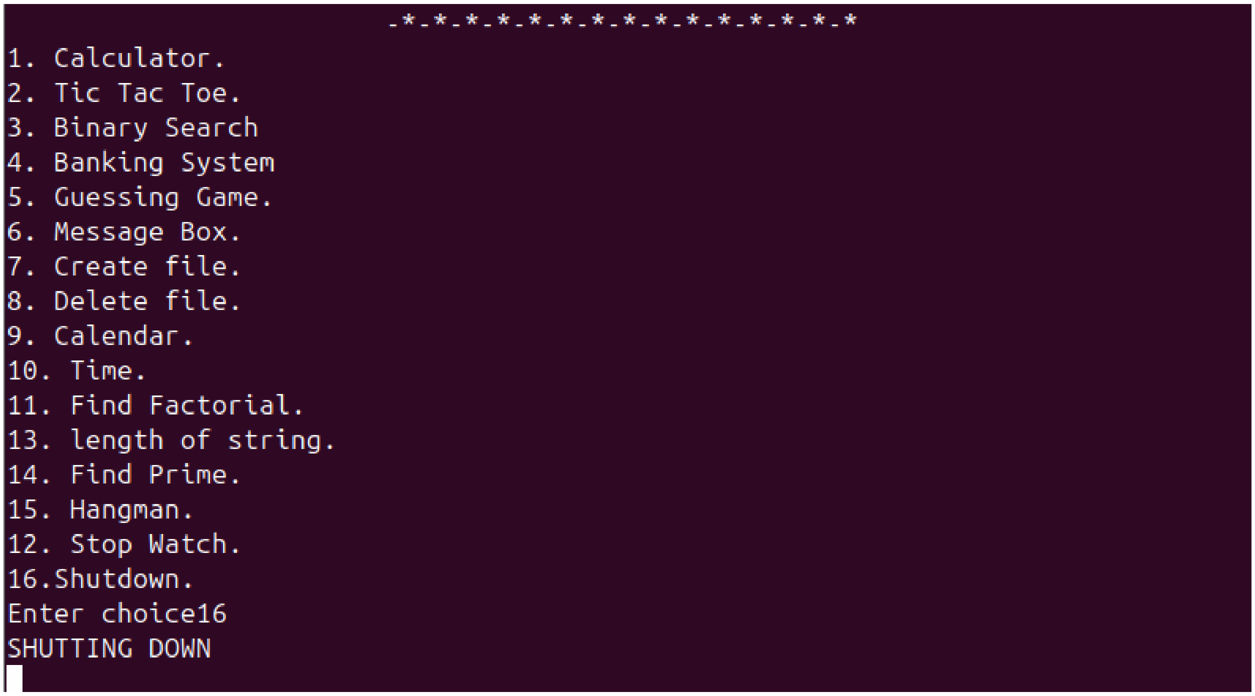
```
                -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
                        WELCOME TO FACTORIAL FINDING PROCCESS!
                -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
Press 1 to start proccess
Press 0 to exit
1
Enter a positive integer: 9
Factorial of 9 is: 362880
Press 1 to start proccess
Press 0 to exit
```

## 8.Stop Watch

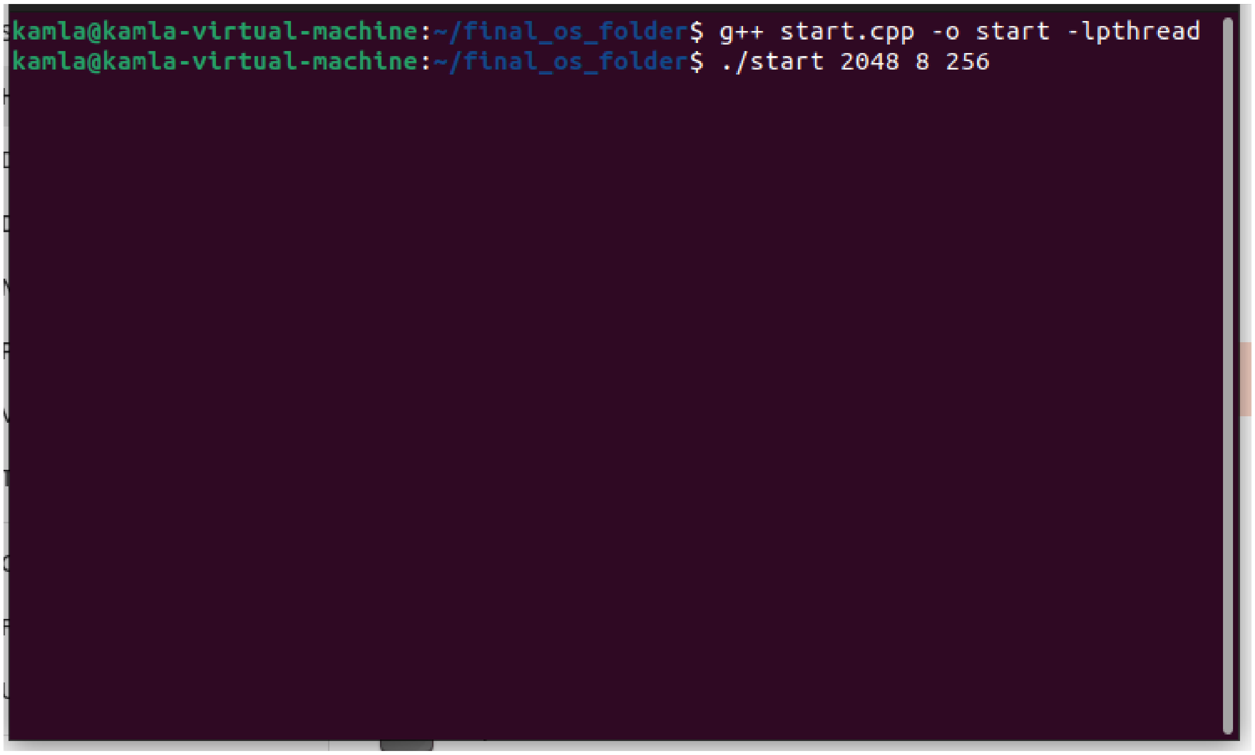


```
                -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
                        WELCOME TO STOP WATCH PROCCESS!
                -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
Stopwatch started. Press Enter to stop.
Elapsed time (in seconds): 0.000118
Elapsed time (in seconds): 1.0009
Elapsed time (in seconds): 2.00158
Elapsed time (in seconds): 3.00226
Elapsed time (in seconds): 4.00294
Elapsed time (in seconds): 5.00323
Elapsed time (in seconds): 6.004
Elapsed time (in seconds): 7.0043
Elapsed time (in seconds): 8.00474
Elapsed time (in seconds): 9.00499
Elapsed time (in seconds): 10.0055
Elapsed time (in seconds): 11.006
Elapsed time (in seconds): 12.0064
Elapsed time (in seconds): 13.007
```

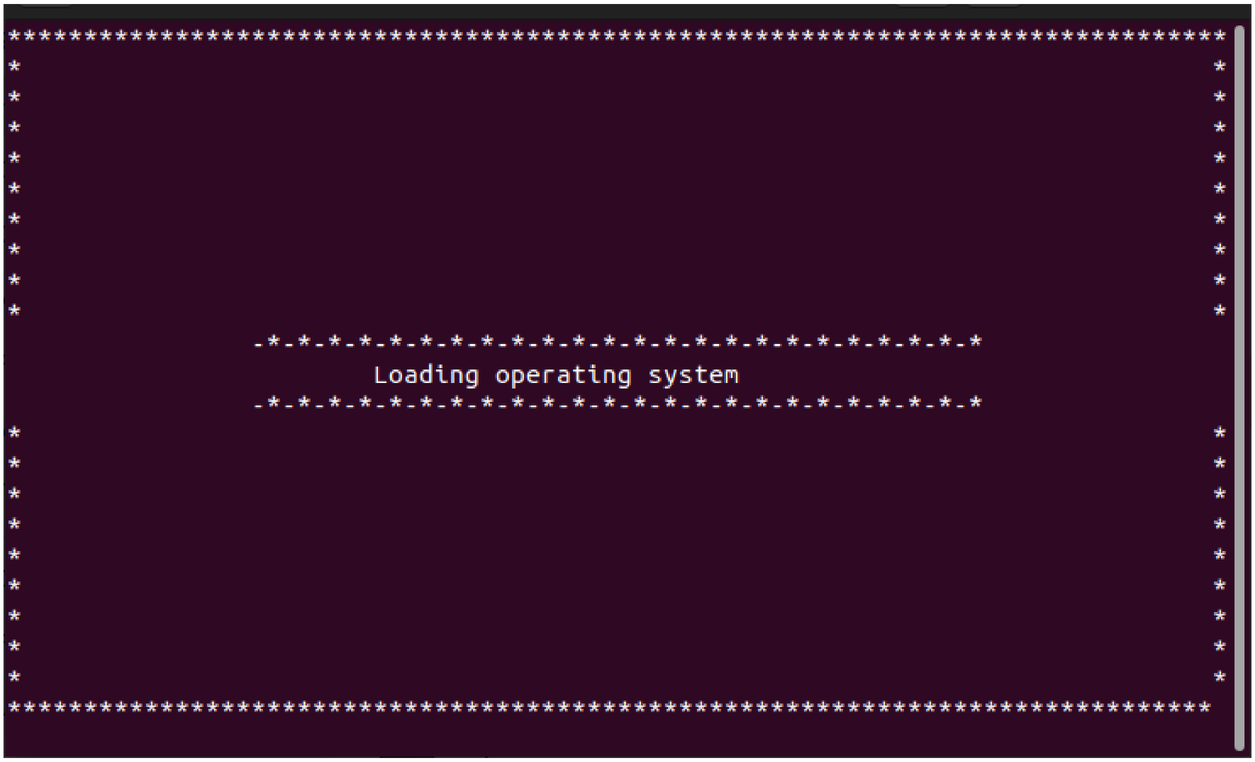
## 9.Shutting Down:



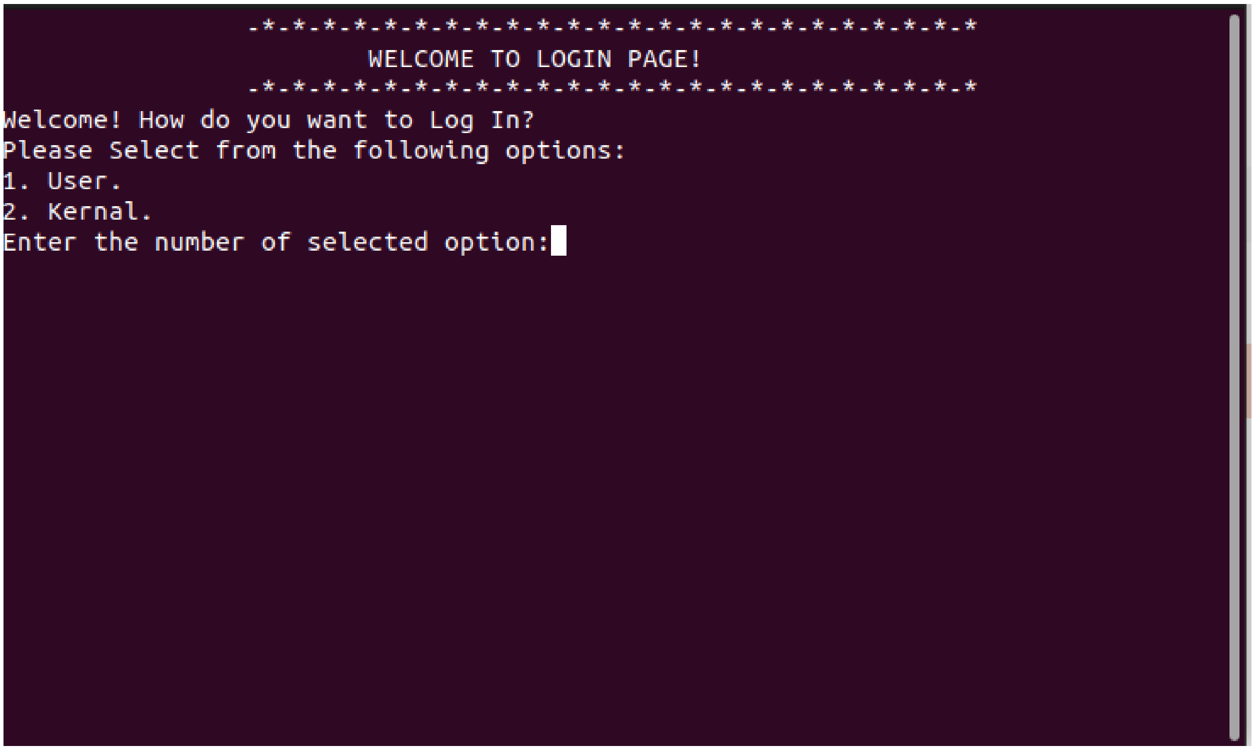
```
                        _*_*_*_*_*_*_*_*_*_*_*_*_*_*_*
1. Calculator.
2. Tic Tac Toe.
3. Binary Search
4. Banking System
5. Guessing Game.
6. Message Box.
7. Create file.
8. Delete file.
9. Calendar.
10. Time.
11. Find Factorial.
13. length of string.
14. Find Prime.
15. Hangman.
12. Stop Watch.
16.Shutdown.
Enter choice16
SHUTTING DOWN
```



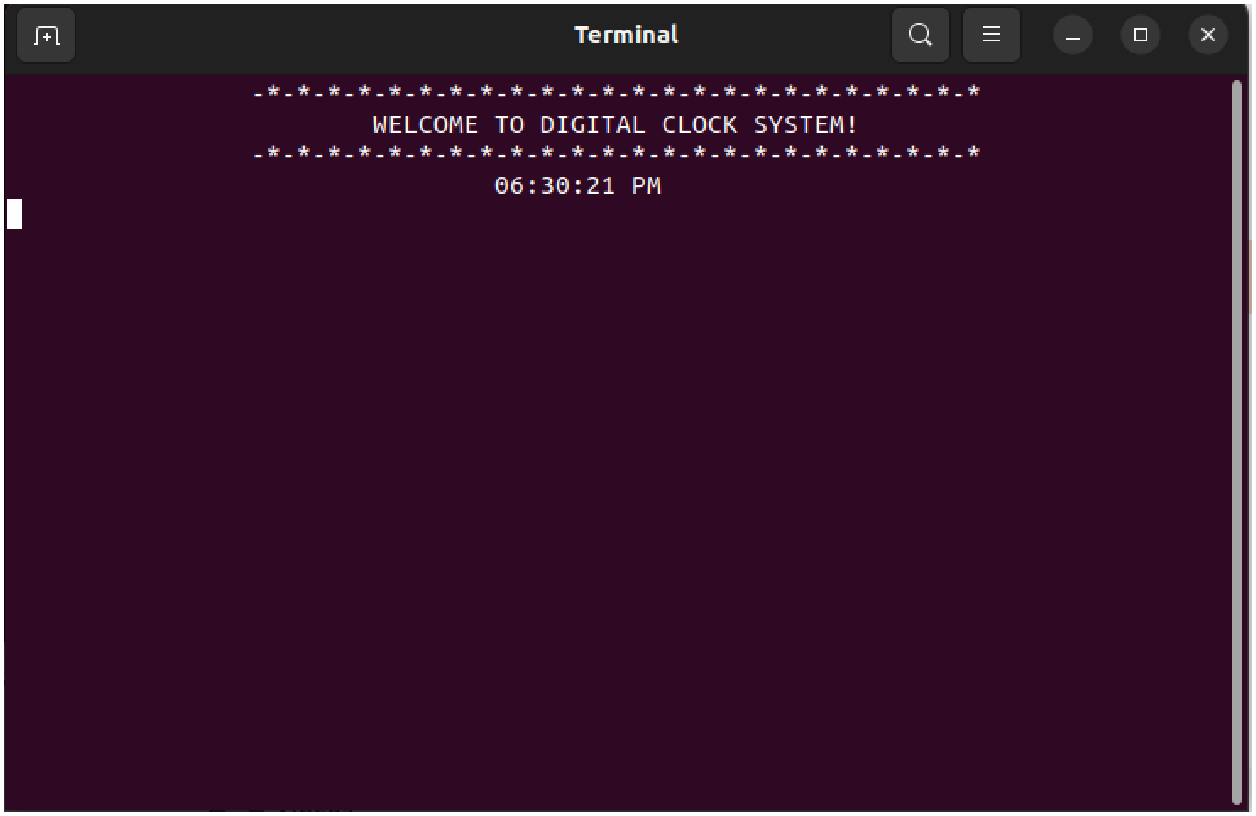
```
kamla@kamla-virtual-machine:~/final_os_folder$ g++ start.cpp -o start -lpthread
kamla@kamla-virtual-machine:~/final_os_folder$ ./start 2048 8 256
```



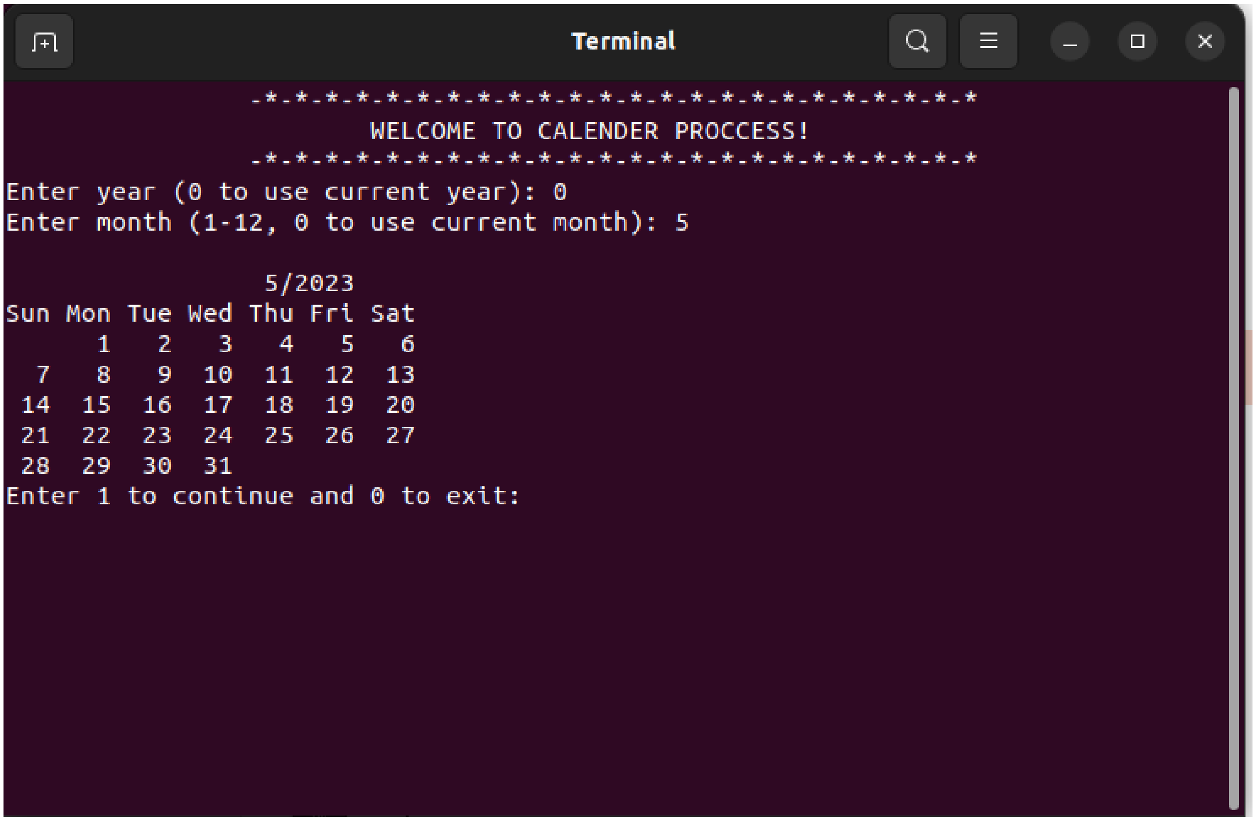
```
********************************************************************************
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
                -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
                        Loading operating system
                -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*                                                                              *
*******************************************************************************
```



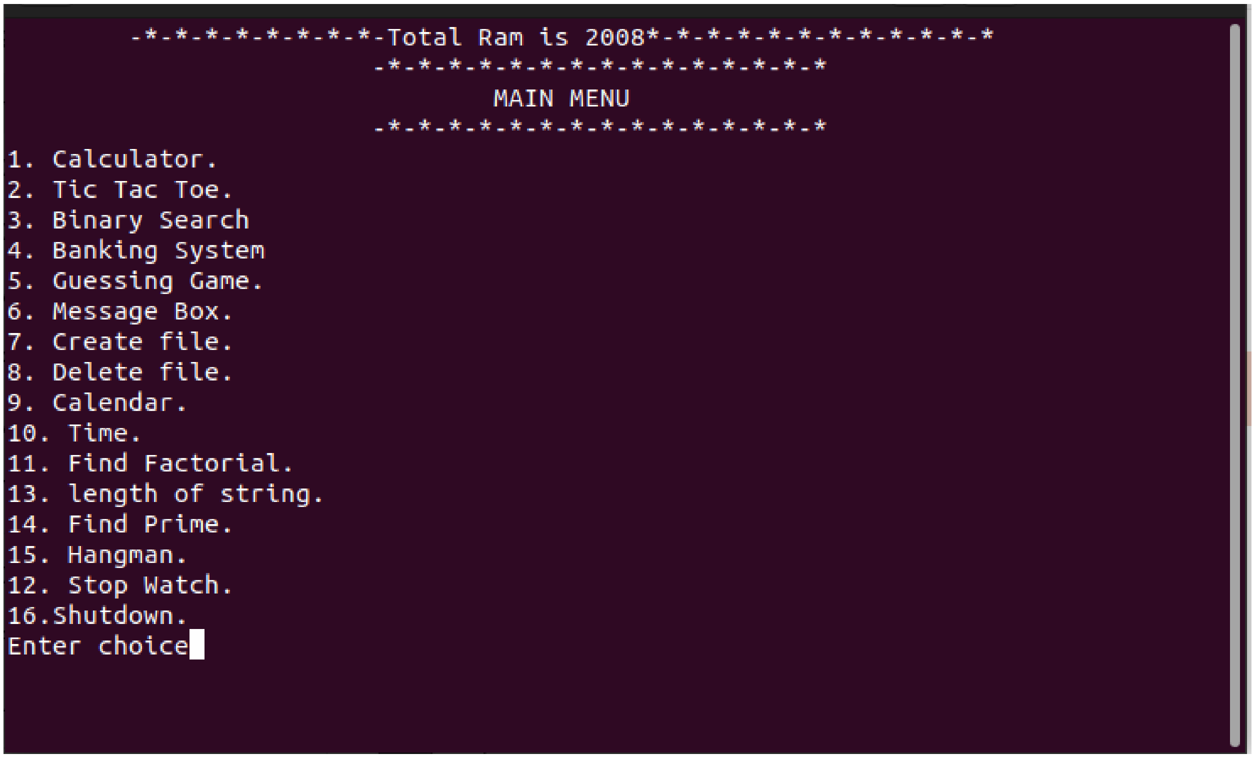
```
                -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
                        WELCOME TO LOGIN PAGE!
                -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
Welcome! How do you want to Log In?
Please Select from the following options:
1. User.
2. Kernal.
Enter the number of selected option:
```



```
                -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
                        WELCOME TO DIGITAL CLOCK SYSTEM!
                -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
                                06:30:21 PM
```



```
                -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
                        WELCOME TO CALENDER PROCCESS!
                -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
Enter year (0 to use current year): 0
Enter month (1-12, 0 to use current month): 5

                 5/2023
Sun Mon Tue Wed Thu Fri Sat
      1   2   3   4   5   6
  7   8   9  10  11  12  13
 14  15  16  17  18  19  20
 21  22  23  24  25  26  27
 28  29  30  31
Enter 1 to continue and 0 to exit:
```



```
        -*-*-*-*-*-*-*-*-Total Ram is 2008*-*-*-*-*-*-*-*-*-*-*-*
                        -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
                                MAIN MENU
                        -*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
1. Calculator.
2. Tic Tac Toe.
3. Binary Search
4. Banking System
5. Guessing Game.
6. Message Box.
7. Create file.
8. Delete file.
9. Calendar.
10. Time.
11. Find Factorial.
13. length of string.
14. Find Prime.
15. Hangman.
12. Stop Watch.
16.Shutdown.
Enter choice
```