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(An Autonomous Institution under Visvesvaraya Technological University, Belagavi)

**(APPROVED BY AICTE, NEW DELHI)**

Department of Electronics and Communication Engineering



*Course Activity Report on*

**Bank Application**

**in**

**C/C++**

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**Guide**

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## Bank Application

### Objective:

To develop bank application and validate the account holder based on current time OTP generation.

### CODE:

```
#include<stdio.h>
#include<string.h>
#include<time.h>

#define N 5//number of customers

//Function declarations
void deposit();
void withdraw();
void balance();
int otpgenerate();

//Structure to maintain accounts
struct account{
    long int accno;//account number
    char name[20]//name of customer
    char type;//saving or current
    float bal;//balance
    int pin;
}custmer[N]={ {101,"Shubham",'S',10000,111},
               {102,"Shreyas",'S',12000,222},
               {103,"Vrushabh",'S',14000,333},
               {104,"Swapnil",'C',90000,444},
               {105,"SwapnilC",'C',2000,555}
};

int accin;//account index in the structure
float amount;//withdraw or deposit amount

//function to generate OTP based o current time
int otpgenerate()
{
    FILE *fp;//file pointer to hold file address

    void fstr(char str[100])//function to put a string into the file
    {
        fp=fopen("otp.txt","a");
        fprintf(fp,str);
        fclose(fp);
    }
}
```

```

void fint(int a)//function to put a integer into the file
{
    fp=fopen("otp.txt","a+");
    fprintf(fp,"%d",a);
    fclose(fp);
}

fp=fopen("otp.txt","w+");
fprintf(fp,"OTP GENERATION BASED ON CURRENT TIME\n");
fclose(fp);
int i,j,otp[7],otp1,otp2,rem;
time_t t;//Variable of type time
time(&t);
char tim[26];//String Variable to store current time
int binary[25][7];//array to hold binary value of each character of the current time
int asci[25];//array to hold ASCII value of the each character of the current time

strncpy(tim,ctime(&t),25);//copy current time into a string
fstr(tim);//put current time into file

//Converting each character of current time to ASCII value
for(i=0;tim[i]!='\0';i++)
{
    asci[i]=(int)(tim[i]);
}

//binary sequence initialization to avoid padding of zeros
for(i=0;i<25;i++)
{
    for(j=0;j<6;j++)
    {
        binary[i][j]=0;
    }
}

//binary values calculation of the ASCII values of each current time character
for(i=0;i<25;i++)
{
    for(j=0;j<7;j++)
    {
        binary[i][j]=asci[i]%2;
        asci[i]=asci[i]/2;
    }
}

//add each column value in a single dimensional array index
for(i=0;i<7;i++)
{
    for(j=0;j<25;j++)
    {

```

```

        otp[i]+=binary[j][i];
    }
}

//add each member of otp in otp1
otp1=0;
for(i=0;i<7;i++)
{
    otp1+=otp[i];
}

//fixing length of otp to 6
int otp1len=6;
otp2=0;//to store the otp of length=otp1len
for(i=0;i<otp1len;i++)
{
    rem=otp1%10;
    otp1=otp1/10;
    otp2=otp2*10+rem;
}

fstr("\nOTP = ");
fint(otp2);//write OTP to fi
return(otp2);
}

//Function to deposit amount in the account
void deposit()
{

    printf("Enter the amount = ");
    scanf("%f",&amount);
    printf("\n");
    custmer[accin].bal+=amount;//add amount to the account
    balance();
}

//Function to withdraw amount amount from account
void withdraw()
{
    printf("Enter the amount = ");
    scanf("%f",&amount);
    printf("\n");
    int otp=otpgenerate();//OTP generation to validate the withdraw transaction
    int count=0,pw;

    //Check for balance availability
    if(amount<=custmer[accin].bal)
    {

```

```

pass1:
    printf("\nenter OTP ");
    scanf("%d",&pw);
    printf("\n");
    //check entered OTP matches with generated OTP
    if(!(otp==pw))
    {
        count++;
        printf("\nWrong OTP\nattempted %d times\nmaximum attempts left %d\n",count,3-
count);
        if(count<3)
            goto pass1;
        else
        {
            printf("maximum attempts reached\nYOUR ACCOUNT IS
LOCKED\nCONTACT BANK FOR MORE DETAILS\n ");
            exit(0);
        }
    }
    else
    {
        custmer[accin].bal-=amount;//Withdraw Amount
        balance();
    }
}
else
{
    printf("Insufficient Balance in your account\n");
    balance();
}
}

//Function to display balance
void balance()
{
    printf("Balance = %f\n",custmer[accin].bal);
}

int main()
{
    time_t t;
    time(&t);

    while(1){
        int accnum,i,ch,f=0,pw,count=0;
        start1:
        printf("*****SPM BANK *****\t\t\t%s",ctime(&t));
        printf("Enter the Account number= ");
    }

```

```

scanf("%d",&accnum);//input account number
printf("\n");

for(i=0;i<N;i++)//check for existence of the account
{
    if(accnum==custmer[i].accno)
    {
        accin=i;
        f=1;
        break;
    }
}
if(f==0)
{
    printf("\nInvalid Account number \n");
    exit(0);
}

int otp=otpgenerate();//OTP generation for login
pass:
printf("\nenter OTP ");//Input OTP from user
scanf("%d",&pw);
printf("\n");
if(!(otp==pw))//Password validation and if entered wrong then give max of 3 tries then
lock account
{
    count++;
    printf("\nWrong password\nattempted %d times\nmaximum attempts left
%d\n",count,3-count);
    if(count<3)
        goto pass;
    else
    {
        printf("maximum attempts reached\nYOUR ACCOUNT IS LOCKED\nCONTACT
BANK FOR MORE DETAILS\n ");
        exit(0);
    }
}

//Display account details
printf("Account number= %d\nName : %s\nAccount type= %c\nBalance =
%f\n",custmer[accin].accno,custmer[accin].name,custmer[accin].type,custmer[accin].bal);

while(1)
{
    //Bank menu
    time_t t;
    time(&t);
    printf("*****MENU*****\t\t\t%s",ctime(&t));

```

```

printf("\nEnter your choice\n1 : Balance Enquiry\n2 : Deposit Amount \n3 : Withdraw
Amount\n4 :Sign Out\n5 :Exit\n");
scanf("%d",&ch);//input choice of operation
switch(ch)
{
    case 1:balance();break;//to display balance
    case 2:deposit();break;//to deposit amount
    case 3:withdraw();break;//to withdraw amount
    case 4: system("cls");//sign out
        goto start1;
    case 5:exit(0);//close application
    default:printf("Enter the correct choice");break;
}
}
}
return 0;
}

```

## INPUT/OUTPUT:

Sample Input/output 1:

Login using OTP :-

The screenshot shows a Windows desktop with two windows. The primary window is a command prompt titled "D:\Engineering\5th sem\college\activity\c\BankSoftware.exe". It displays the output of a C++ program for a bank system. The program starts with a header "\*\*\*\*\*SPM BANK \*\*\*\*\*" and a timestamp "Thu Nov 21 18:17:01 2019". It prompts the user to "Enter the Account number=" and the user enters "101". Next, it prompts for "enter OTP" and the user enters "231515". The program then displays account details: "Account number= 101", "Name : Shubham", "Account type= S", and "Balance = 10000.000000". It then shows a menu titled "\*\*\*\*\*MENU\*\*\*\*\*" with a timestamp "Thu Nov 21 18:17:27 2019". The menu options are: "1 : Balance Enquiry", "2 : Deposit Amount", "3 : Withdraw Amount", "4 :Sign Out", and "5 :Exit". The secondary window is a Notepad application titled "otp.txt - Notepad". It contains the text "OTP GENERATION BASED ON CURRENT TIME", a timestamp "Thu Nov 21 18:17:03 2019", a base64-encoded string "wGt0]e]Q", and the final output "OTP = 231515", where the number "231515" is highlighted in blue.

```

D:\Engineering\5th sem\college\activity\c\BankSoftware.exe
*****SPM BANK *****          Thu Nov 21 18:17:01 2019
Enter the Account number= 101

enter OTP 231515

Account number= 101
Name : Shubham
Account type= S
Balance = 10000.000000
*****MENU*****                Thu Nov 21 18:17:27 2019

Enter your choice
1 : Balance Enquiry
2 : Deposit Amount
3 : Withdraw Amount
4 :Sign Out
5 :Exit

```

otp.txt - Notepad

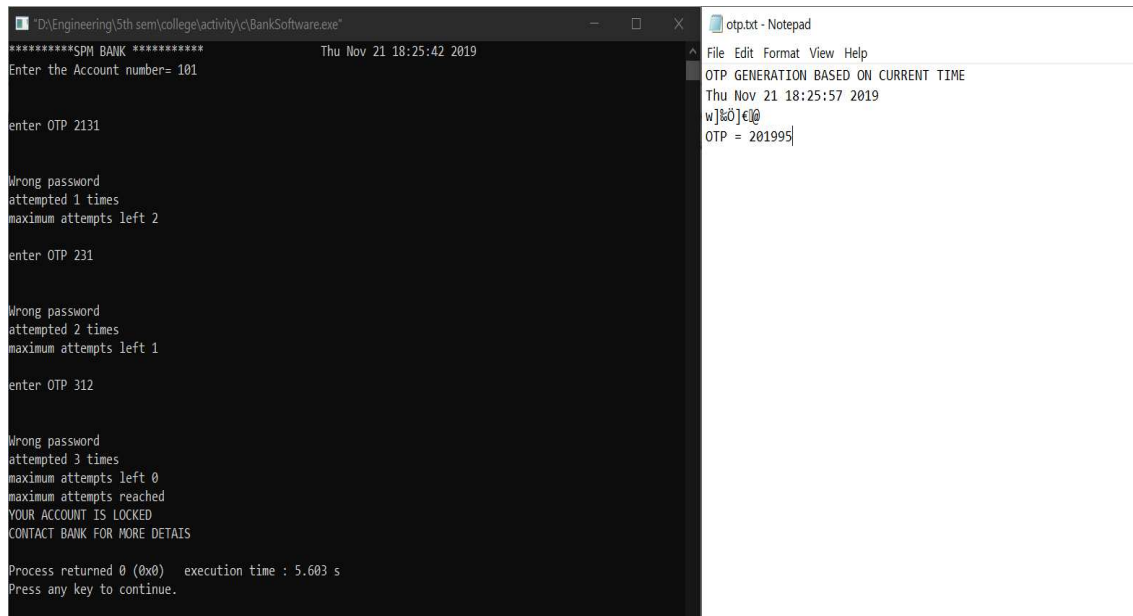
```

File Edit Format View Help
OTP GENERATION BASED ON CURRENT TIME
Thu Nov 21 18:17:03 2019
wGt0]e]Q
OTP = 231515

```

## Sample Input/output 2:

Invalid login attempts :-



The screenshot shows a terminal window titled "D:\Engineering\5th sem\college\activity\c\BankSoftware.exe" and a Notepad window titled "otp.txt - Notepad".

**Terminal Output:**

```
*****CPM BANK *****
Thu Nov 21 18:25:42 2019
Enter the Account number= 101

Enter OTP 2131

Wrong password
attempted 1 times
maximum attempts left 2

Enter OTP 231

Wrong password
attempted 2 times
maximum attempts left 1

Enter OTP 312

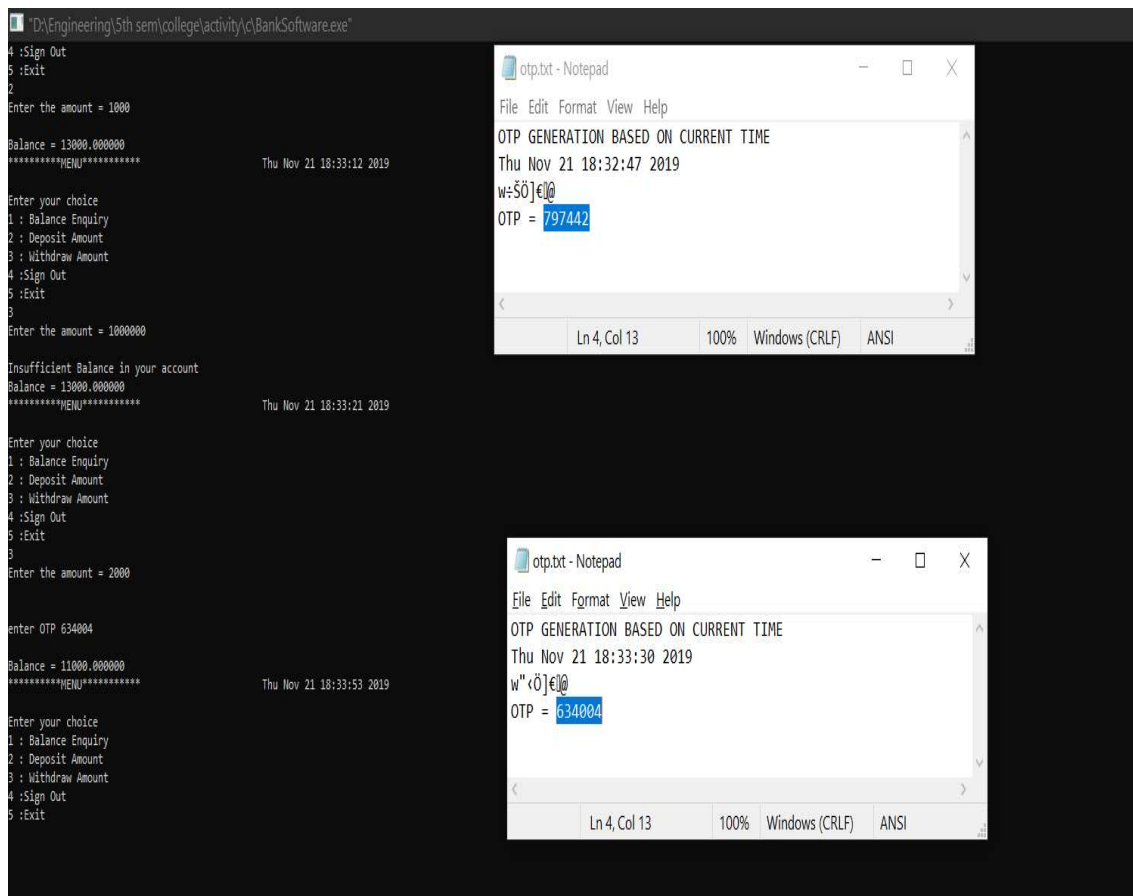
Wrong password
attempted 3 times
maximum attempts left 0
maximum attempts reached
YOUR ACCOUNT IS LOCKED
CONTACT BANK FOR MORE DETAILS

Process returned 0 (0x0)   execution time : 5.603 s
Press any key to continue.
```

**Notepad Content:**

```
File Edit Format View Help
OTP GENERATION BASED ON CURRENT TIME
Thu Nov 21 18:25:57 2019
w]80]e[]@
OTP = 201995
```

## Sample Input/output 3:



The screenshot shows a terminal window titled "D:\Engineering\5th sem\college\activity\c\BankSoftware.exe" and two Notepad windows titled "otp.txt - Notepad".

**Terminal Output:**

```
4 :Sign Out
5 :Exit
2
Enter the amount = 1000
Balance = 13000.000000
*****MENU*****
Thu Nov 21 18:33:12 2019

Enter your choice
1 : Balance Enquiry
2 : Deposit Amount
3 : Withdraw Amount
4 :Sign Out
5 :Exit
3
Enter the amount = 1000000
Insufficient Balance in your account
Balance = 13000.000000
*****MENU*****
Thu Nov 21 18:33:21 2019

Enter your choice
1 : Balance Enquiry
2 : Deposit Amount
3 : Withdraw Amount
4 :Sign Out
5 :Exit
3
Enter the amount = 2000

Enter OTP 634004
Balance = 11000.000000
*****MENU*****
Thu Nov 21 18:33:53 2019

Enter your choice
1 : Balance Enquiry
2 : Deposit Amount
3 : Withdraw Amount
4 :Sign Out
5 :Exit
```

**Notepad Content (Top):**

```
File Edit Format View Help
OTP GENERATION BASED ON CURRENT TIME
Thu Nov 21 18:32:47 2019
w:$0]e[]@
OTP = 797442
```

**Notepad Content (Bottom):**

```
File Edit Format View Help
OTP GENERATION BASED ON CURRENT TIME
Thu Nov 21 18:33:30 2019
w"<0]e[]@
OTP = 634004
```



**Limitations:**

- 1) The Bank application is restricted to stored account details only.
- 2) Sometimes OTP length gets reduced due to the addition of numbers while generating OTP because of digit 0 at the end of the hash value of OTP.

**Improvements:**

- 1) New account opening function can be included.
- 2) If Balance is not sufficient while withdrawing, Loan function can be provided.
- 3) Passbook for account holder .
- 4) Updating information of existing account.