



# BANK OS

CONTRIBUTORS :

TEAM - 2

SRIPRANAV MANNEPALLI  
MAHESWARA REDDY  
CHIRAG GUPTA  
AVS HRUDAI

CS18B036  
CS18B032  
CS18B006  
CS18B001

# Introduction :

The Operating System we developed can be used by the Bank's cashier, manager and also bank account holder. We made it in a way that it covers all the basic tasks required by the banks.

## OS concepts that we covered in this project:

- Process Scheduling
- InterProcess Communication.
  - Message Passing.
  - Shared memory.
- Process Synchronization.
- High level memory management.
- Deadlock detection, Deadlock Recovery.
- Device Management.

# Features :

Our Operating System has the following features:

- Creating a bank account. We can create as many bank accounts as we need.
- Login to your Bank account.
- Deposit money.
- Withdraw money.
- Transfer money to a different account.
- Show account details..
- Advertisements of the bank.
- Show all accounts details.
- Add review.
- Add comment.

We used **Screen(vga)** as a means to show output along with the already provided shell.

## Xinu features modified or added.

Feature	Modified or Added	Justification
Screen(vga) (A new Device)	Added (device/vga/vga.c)	We added a screen ( Output device ) to show outputs.The backend UI of VBox is taken as SCREEN.
Deadlock	Added. (system/ deadlock.c)	We needed an algorithm to detect and recover deadlock situations.

# Xinu features used “as-is”.

Feature	Justification
Semaphores : wait , signal	We used semaphores to implement <i>process synchronization</i> .
Message Passing :Send , receive , recvclr	We used these to implement <i>message passing</i> (IPC).
High Level Memory Management	We used buffer pools to store all the bank details and user details.
Shell commands	We used shell commands as an interaction medium with the OS.

# Xinu features Deleted.

Feature	Justification
Shell commands	We removed all unnecessary shell commands.
device/sdmc	We are not using any SD memory card.
device/rfs	We are not using any remote files.
device/nam	We are not using any of these map function for our features.
device/lfs	We are not using file systems.
Header files in include dir	We removed header files that are not used in our project.

```
sripranav@sripranav: ~/FINAL-XINU-OS
ksh $ bank addaccount
Please Fill the Following Details
=====
UserName      : sripranav
PassWord     : 123456
ReEnter      : 123456
Your Account Number: 00001
=====
ksh $ user login
Please Fill the Following Details
=====
Account Number : 00001
PassWord      : 123456
Welcone, sripranav
=====
ksh $
```

```
backend [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
===== ADVERTISEMENT =====
##### Worried about Your Education Cost? #####
##### Get a Student Loan at just 12pa interest #####
=====
```

The display on the right is our Screen device(VGA) to show output.

Here we can see account creation and user login and featured advertisements

```
sripranav@sripranav: ~/FINAL-XINU-OS
ksh $ user deposit 2000
ksh $ user withdraw 500
ksh $
```

```
backend [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Started Deposit Process with amount Rs 2000
.....
Depositing
.....
Deposited the amount
Balance in Your Account is: Rs 2000
=====
Started Withdraw Process with amount Rs 500
.....
Withdrawing
.....
Withdrawned the amount
Balance in Your Account is: Rs 1500
=====
```

Here we can see user deposits and withdrawals being executed. Each process takes ~10 seconds to execute.

```
sripranav@sripranav: ~/FINAL-XINU-OS
xsh $ user transfer 00002 250
xsh $ bank account show all
xsh $
```

```
backend [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

***** ADVERTISEMENT *****
***** Use our Credit Card and Get 10X Reward Points *****
***** On Dining, Movies, Shopping and much more *****
*****

*****
Started Transfer Process with amount Rs 250
.....
Transferring
.....
Transferred the amount
Balance in Your Account is: Rs 1250

*****
UserName      AccountNumber  Balance
sripranavm    00001         1250
ravireddy     00002         250
*****
```

```
sripranav@sripranav: ~/FINAL-XINU-OS
xsh $ review
xsh $ comment

Comment:
DEADLOCK OCCURED...

Total Available Resources :
Keyboard   Screen
0          0
Currently Allocated Resources :
Process   : Keyboard   Screen
Advertisment: 0         0
Review    : 1         0
Comment   : 0         1

Resources Needed :
Process   Keyboard   Screen
Advertisment: 0       1
Review     : 1       1
Comment    : 1       1
Deallocating a Resource :
Keyboard
Killing The process :
Comment :

Review :      I am giving my review.....
xsh $
```

```
ar && cd ~/xinu/compile && make clean && make && exit"
"sudo minicom"

backend [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

*****
How Do You Like Our Bank Services?
Please Give us your review
Please Provide your review after 10 seconds...
Please Provide your review now...
Your I am giving my review.....
*****
*****
***** ADVERTISEMENT *****
***** Open your Deemat Account with our Bank *****
***** And start trading with just 0.5% brokerage *****
*****
```

Transfer command being executed here. This command takes ~10 seconds to execute. We can also see all bank accounts available in the bank currently.

Here we are seeing a *deadlock situation*.

There are two processes comment and review. The resources are keyboard and screen. Both the processes need both the resources. First, the comment process acquires keyboard and review process acquires screen.

To get out of this deadlock, we kill a process, in this case comment process.

## CODE SIZE (BANK OS vs ORIGINAL XINU):

BANK OS  
Size : 1.2M

```
sripranav@sripranav: ~/FINAL-XINU-OS
sripranav@sripranav:~/FINAL-XINU-OS$ ls
Makefile  xinu
sripranav@sripranav:~/FINAL-XINU-OS$ du -bhc
29K      ./xinu/device/eth
7.8K     ./xinu/device/vga
6.5K     ./xinu/device/ram
24K      ./xinu/device/tty
71K      ./xinu/device
31K      ./xinu/config
114K     ./xinu/include
5.3K     ./xinu/compile/binaries
23K      ./xinu/compile/bin
567K     ./xinu/compile
46K      ./xinu/shell
150K     ./xinu/system
55K      ./xinu/lib
99K      ./xinu/net
1.2M     ./xinu
1.2M     .
1.2M     total
sripranav@sripranav:~/FINAL-XINU-OS$
```

ORIGINAL  
XINU OS

```
sripranav@sripranav: ~/xinu
sripranav@sripranav:~/xinu$ du -bhc
29K      ./device/eth
13K      ./device/nam
6.5K     ./device/ram
37K      ./device/lfs
24K      ./device/tty
29K      ./device/rds
31K      ./device/sdmc
23K      ./device/rfs
195K     ./device
183K     ./config
154K     ./include
374K     ./compile/binaries
21K      ./compile/bin
1.2M     ./compile
60K      ./shell
127K     ./system
55K      ./lib
99K      ./net
2.1M     .
2.1M     total
sripranav@sripranav:~/xinu$
```

## CONCLUSION :

We used various OS Features that are present in XINU and we also covered Operating Systems Concepts like Process Synchronization , Process Scheduling , Interprocess Communication (Message Passing, Shared Memory) , Context Switching , High Level Memory Management , Deadlock Detection , Deadlock Recovery.

We also got a practical exposure to the concepts that we learnt during the Operating System Theory course.