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**Sixth Semester B.E. Degree Examination, January/February 2004**  
**Computer Science and Engineering /Information Science and Engineering**

**UNIX System Programming**

Time: 3 hrs.]

[Max.Marks : 100

**Note:** Answer any FIVE full questions.

1. (a) What are the major differences between ANSI 'C' and K & R 'C'? Explain each with examples. (10 Marks)
- (b) What are different file types available in POSIX. Explain different commands used to create each type with their argument values, and mention uses. (10 Marks)
2. (a) Describe the data structure and the proceedings involved in file management. (10 Marks)
- (b) Explain file APIs OPEN, READ, FCNTL, ACCESS with their prototypes and argument values. (10 Marks)
3. (a) Explain briefly memory layout of C program. (5 Marks)
- (b) Explain with an example setjmp and longjmp functions. (10 Marks)
- (c) Explain fork and vfork functions with an example program. (5 Marks)
4. (a) What is race condition? Give an example of it. Write a program to demonstrate race condition. (10 Marks)
- (b) Explain wait, waitpid, wait 3 and wait 4 functions with their prototypes and uses. (10 Marks)
5. (a) Explain in detail the terminal login and network login. (10 Marks)
- (b) What is a signal and explain how to setup a signal handlers. (6 Marks)
- (c) What is reentrant function? Explain. (4 Marks)
6. (a) Explain sigprocmask, sigpending, sigaction, and sigsuspend functions with their proto types & uses. (10 Marks)
- (b) Discuss daemon characteristics and coding rules with an example. (10 Marks)
7. (a) What is FIFO? Explain client server communication using FIFO. (10 Marks)
- (b) What is semaphore? Give system V semaphore characteristics and its use for IPC. (10 Marks)
8. Write short note on : (4×5=20 Marks)
  - i) Hardlink and soft link
  - ii) Alarm and pause functions
  - iii) Exit functions
  - iv) Pipes



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Sixth Semester B.E. Degree Examination, July/August 2004  
 Computer Science and Engineering/Information Science and Engineering  
**UNIX System Programming**

[Max. Mar

Time: 3 hrs.]

Note: Answer any FIVE full questions.

1. (a) What are the different features to be implemented in all FIPS conforming system?  
 (b) Explain directory file and FIFO file with examples.  
 (c) Explain with neat figure, the UNIX kernel support for files.
2. (a) Write a C program to implement the UNIX chown functions.  
 (b) Explain file locking and record locking with example.  
 (c) Explain the following API's with its prototype and example.  
 i) Open      ii) Creat      iii) read      iv) fcntl
3. (a) What is a race condition? Write a program to demonstrate race condition.  
 (b) Explain with figure, how a C program can be started and various ways of functions with its prototype.  
 (c) What are the different ways for a process to terminate. Explain : exit.
4. (a) What is terminal login? Differentiate between terminal login and network login.  
 (b) Write a program that creates a zombie and then call system to execute the process to verify that the process is zombie.  
 (c) Explain orphaned process groups with examples.
5. (a) What is a signal? Explain the different conditions generated by a signal.  
 (b) Explain with example the use of system function.  
 (c) Explain with examples :  
 i) Kill and raise functions      ii) Alarm and pause functions.
6. (a) Discuss Daemon characteristics and coding rules.  
 (b) Write a function that can be called from a program that wants to create a daemon.
7. (a) Explain semaphores with the different functions.  
 (b) Write a program to create a pipe from the parent to the child and vice versa.  
 (c) Explain with figure, client server communication using FIFO.
8. (a) What are the advantages of designing the server to be a separate process?  
 (b) Explain client server connection functions with different function.  
 (c) Explain with neat figure, the passing of file descriptors between processes.

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1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that proper record-keeping is essential for ensuring transparency and accountability in the organization's operations.

2. The second part of the document outlines the various methods and tools used to collect and analyze data. It highlights the need for consistent data collection procedures and the use of advanced analytical techniques to derive meaningful insights from the collected information.

3. The third part of the document focuses on the role of technology in modern data management. It discusses how cloud-based solutions and data integration tools have revolutionized the way organizations store, access, and analyze their data, leading to more efficient and effective decision-making processes.

4. The fourth part of the document addresses the challenges associated with data security and privacy. It stresses the importance of implementing robust security measures to protect sensitive information from unauthorized access and data breaches, while also ensuring compliance with relevant data protection regulations.

5. The fifth part of the document explores the future of data management and analytics. It discusses emerging trends such as artificial intelligence, machine learning, and big data, and how these technologies will continue to shape the way organizations leverage their data for strategic growth and innovation.

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Sixth Semester B.E. Degree Examination, July/August 2005  
Computer Science and Engineering /Information Science and Engineering  
(Old Scheme)

## UNIX System Programming

Time: 3 hrs.]

[Max.Marks : 100

- Note:** 1. Answer any FIVE full questions.  
2. All questions carry equal marks.

1. (a) Explain the different file types available in POSIX with the commands that can be used to create the file types. (10 Marks)  
(b) Explain the actions taken by the Kernel when a process calls the open function to open a file. (10 Marks)
2. (a) Explain the access mode flags and access modifier flags. Also explain how the permission value specified in an 'Open' call is modified by its calling process 'unmask' value. Illustrate with an example. (10 Marks)  
(b) Explain the use of the following APIs with example :  
i) fcntl ii) lseek iii) write iv) close (10 Marks)
3. (a) With suitable example explain the various directory file APIs. (10 Marks)  
(b) Write a C program to illustrate the use of mkfifo, open, read & close APIs for a FIFO file. (10 Marks)
4. (a) Explain briefly the memory layout of a C program. (10 Marks)  
(b) With an example explain the use of setjmp and longjmp functions. (10 Marks)
5. (a) What is race condition? Write a program to demonstrate the race condition. (10 Marks)  
(b) Explain the different exec functions. Describe how their functioning differ from each other. (10 Marks)
6. (a) What is signal? Explain the signal mask with example. (10 Marks)  
(b) Explain the daemon characteristics and coding rules. (10 Marks)
7. (a) What is message queue? Explain client-server communication using a message queue. (10 Marks)  
(b) Write a program to create a pipe from the parent to the child and send the data down the pipe. (10 Marks)
8. Write short notes on any FOUR of the following :  
a) Memory allocation  
b) Semaphores  
c) Pipes  
d) Job control  
e) UNIX files

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(5 × 4 = 20 Marks)

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<b>NEW SCHEME</b>
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**Sixth Semester B.E. Degree Examination, January / February 2006**  
**Computer Science and Engineering/Information Science & Engineering**  
**Unix Systems Programming**

Time: 3 hrs.)

(Max.Marks : 100)

**Note:** Answer any FIVE full questions.

1. (a) What is POSIX standard ? Explain different subsets of POSIX standard. Write the structure of the program to filter out non-POSIX compliant codes from a user program. (6 Marks)
- (b) Write a C/C++ *POSIX* compliant program to check the following limits:
  - i) Number of clock ticks
  - ii) Maximum number of child processes
  - iii) Maximum path length
  - iv) Maximum characters in a file name
  - v) Maximum number of open files per process (8 Marks)
- (c) Explain the common characteristics of API and describe the error status codes. (6 Marks)
2. (a) Explain the different file types available in UNIX or POSIX systems. (8 Marks)
- (b) Describe the UNIX Kernel support for files. (8 Marks)
- (c) Write the code segment in C that reads utmost 100 bytes into a variable but from standard input. (4 Marks)
3. (a) List and explain the access mode flags and access modifier flags. Also explain how the permission value specified in an 'open' call is modified by its calling process 'umask' value. (8 Marks)
- (b) Explain how fcntl API can be used for file and record locking. (8 Marks)
- (c) Give the hierarchy structure of the file classes. (4 Marks)
4. (a) What is fork and vfork ? Explain with an example program for each. (8 Marks)
- (b) Describe the UNIX kernel support for a process. Show the related data structures. (8 Marks)
- (c) Write a program in C/C++ to obtain process attributes. (4 Marks)
5. (a) What is job control ? Summarize the job control features with the help of a figure. (10 Marks)
- (b) Explain the different exec functions ? Describe how their functioning differ from each other. (10 Marks)
6. (a) What is a signal ? Discuss any five POSIX - defined signals. Explain how to setup a signal handler. (10 Marks)
- (b) What is a daemon ? Give its basic coding rules. (10 Marks)

Contd.... 2

7. (a) What are pipes ? Explain their limitations. Explain how pipes are created and used in IPC with an example. (10 Marks)

(b) Explain the UNIX kernel support for messages. Show the related data structures. (10 Marks)

8. Write short notes on any FOUR:

(a) Race condition

(b) Zomble process

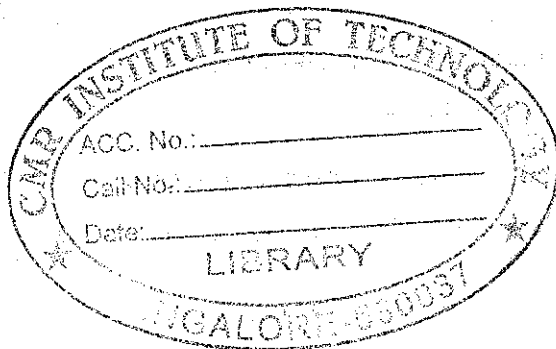
(c) Network Login

(d) Co process

(e) Interval timers

(5×4=20 Marks)

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<b>NEW SCHEME</b>
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### Sixth Semester B.E. Degree Examination, July 2006

## Unix Systems Programming

Time: 3 hrs.]

[Max. Marks:100

**Note : Answer any Five full questions.**

- 1 a) What are the major differences between ANSI 'C' and K & R 'C'? Explain with examples. (10 Marks)
- b) Write a C/C++ POSIX compliant program that supported on any given system using feature test macros. (10 Marks)
- 2 a) Explain the different file types available in UNIX or POSIX systems. (08 Marks)
- b) Describe the UNIX kernel support for files. (08 Marks)
- c) Write a program in C/C++ to emulate the UNIX In Command. (04 Marks)
- 3 a) Explain how fcntl API is used for file and record locking. (08 Marks)
- b) With an example program, explain the use of setjmp and longjmp functions. (08 Marks)
- c) Write a C/C++ program that outputs the contents of its environment list. (04 Marks)
- 4 a) What is fork and vfork? Explain with an example program for each. (10 Marks)
- b) What is a Zombie process? Write a C/C++ program to avoid Zombie process by forking twice. (10 Marks)
- 5 a)- How UNIX operating system keeps process accounting? (10 Marks)
- b) . What is Job Control? Summarize the Job Control features with the help of a figure. (10 Marks)
- 6 a) What is a SIGNAL? Explain how to setup a signal handler? (10 Marks)
- b) What is a daemon? Discuss the basic coding rules. (10 Marks)
- 7 a) What is FIFO? Explain how it is used in IPC. Discuss with an example the client-server communication using FIFOS. (10 Marks)
- b) What is shared memory concept? How it is used for implementing IPC? (10 Marks)
- 8 Write short notes on : (4x5=20 Marks)
  - a) Inodes, b) Race Condition, c) 4.3+BSD Network Login, d) Semaphores.

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<b>NEW SCHEME</b>
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**Sixth Semester B.E. Degree Examination, Dec. 06 / Jan. 07**  
**Computer Science and Engineering**  
**UNIX Systems Programming**

Time: 3 hrs.]

[Max. Marks:100

- Note:** 1. Answer any FIVE full questions.  
 2. Diagrams must be neatly drawn.  
 3. Programs if any must be well documented.

- 1
  - a. What is the need for standardization of UNIX and C programming language? Bring out the major differences between ANSI C and K&R C with examples. (08 Marks)
  - b. List at least four compile time limits along with their minimum values and explain their meaning. Write program that displays the values of the above configuration limits using sysconf and pathconf functions. (08 Marks)
  - c. Write short notes on POSIX.1 FIPS standard. (04 Marks)
  
- 2
  - a. Give a detailed description of the kernel support for files and also explain with a neat diagram the data structure it maintains for its files. (08 Marks)
  - b. Explain the following APIs along with their prototype definitions:  
 i) open ii) lseek iii) fstat iv) chmod v) link vi) umask. (12 Marks)
  
- 3
  - a. List and explain five different file types that are supported on UNIX along with the procedure to create file of each type. (10 Marks)
  - b. List common set of attributes of a file, maintained by a file system and explain the need for storing these attributes. (05 Marks)
  - c. Which of the above (Q.3 b) attributes remain unchanged? Name the commands to be used to change modification time and the hard link count. (05 Marks)
  
- 4
  - a. Give the complete description and usefulness of fcntl and lseek file APIs with an example for each. (08 Marks)
  - b. Describe the stat structure used in stat or fstat API. How do you use fstat to display access permission and file types? Give the code listing that is required. (10 Marks)
  - c. For what type of sticky flag is applicable? What is its implication when set? (02 Marks)
  
- 5
  - a. Process creation and management are the corner stone of a multi-user and multitasking OS. Justify this statement and list the advantages of allowing any process to create new processes. (06 Marks)
  - b. Give the description of fork system call, explaining its purpose, prototype, description and the values it returns on success and meaning of the error when it fails. (06 Marks)
  - c. What is a Zombie process? What is the overhead associated with Zombies? Write a program that waits for its child process to terminate and returns its exit status. Use appropriate macros to display all possible exit status values. (08 Marks)

Contd.... 2

- 6 a. What is race condition? How would you use polling to avoid race conditions? What is the disadvantage of polling? Suggest a suitable technique that obviates the problem associated with polling. (06 Marks)
- b. What is a signal? Explain the different dispositions of a signal when it occurs. When do you say a signal is pending? Write a program that masks SIG\_PIPE and SIG\_ABORT signals, check if they are pending. If pending, unmask and service them. (08 Marks)
- c. What is a Daemon process? Give examples. Explain the procedure along with the code to create a Daemon process. (06 Marks)
- 7 a. List the different IPC mechanisms supported on UNIX or POSIX along with their characteristics. Explain with code example how would you run a pager to display output of parent in the child process, using pipe. (07 Marks)
- b. What is a Coprocess? Illustrate with an example code the usefulness of a coprocess. (06 Marks)
- c. Bring out the importance of key in IPC on system V UNIX. What are the different ways of generating a key? Explain with example, how would you create a message queue and perform send and receive messages. (07 Marks)
- 8 a. Illustrate need and use of setjmp and longjmp functions with an example. How are sigsetjmp and siglongjmp different from the above? (07 Marks)
- b. How would you create hard and soft links to a file? Bring out the important differences between the two with an example. (06 Marks)
- c. With a neat sketch, describe the terminal login process clearly indicating the role of each process in the process. Also indicate the important differences between terminal and network logins. (07 Marks)

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<b>NEW SCHEME</b>
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**Sixth Semester B.E. Degree Examination, July 2007**  
**CS / IS**

**Unix System Programming**

Time: 3 hrs.]

[Max. Marks:100

*Note: Answer any FIVE full questions.*

- 1
  - a. What is POSIX standard? Explain different subsets of POSIX standard. Write the structure of the program to filter out non – POSIX compliant codes from a user program. (08 Marks)
  - b. Write a C/C++ POSIX compliant program that prints the POSIX defined configuration options supported on any given system using feature test macros. (08 Marks)
  - c. What is an API? How it is different from the C library function? Why is calling an API is more time consuming than calling a user function? (04 Marks)
- 2
  - a. List and explain the access mode flags and access modifier flags used in open API. Also explain how the permission value specified in an56+ 'open ' call is modified by its calling process 'umask' value. (08 Marks)
  - b. Describe the UNIX kernel support for files. (08 Marks)
  - c. Write the command to create a block device file called SCS15 with major and minor device numbers 15 and 3 respectively and access rights read – write – execute for everyone. (04 Marks)
- 3
  - a. Discuss how fcntl API is used for file and record locking. (08 Marks)
  - b. Describe the UNIX kernel support for a process. Show the related data structures. (08 Marks)
  - c. Give the hierarchy structure of the file classes. (04 Marks)
- 4
  - a. What is fork and vfork? Explain with an example program for each. (08 Marks)
  - b. What is race condition? Write a program in C/C++ to illustrate the race condition. (08 Marks)
  - c. Write a C/C++ program that outputs the contents of its environment list. (04 Marks)
- 5
  - a. Explain the different exec functions. How does their functioning differ from each other? (10 Marks)
  - b. What is Job control? Summarize the Job control features with the help of a figure. (10 Marks)
- 6
  - a. What is a Signal? Discuss any five POSIX defined signals. Explain how to setup a signal handler. (10 Marks)
  - b. Discuss daemon characteristics and coding rules. (10 Marks)
- 7
  - a. What is shared memory concept? How it is used for implementing IPC? (10 Marks)
  - b. What are Pipes? Explain their limitations. Explain how pipes are created and used in IPC with an example. (10 Marks)
- 8 Write short notes on any Four:
  - a. Zombie process
  - b. Inodes.
  - c. Network login
  - d. Semaphores.
  - e. Process group and sessions. (20 Marks)



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**Sixth Semester B.E. Degree Examination, Dec. 07 / Jan. 08**  
**Unix System Programming**

Time: 3 hrs.

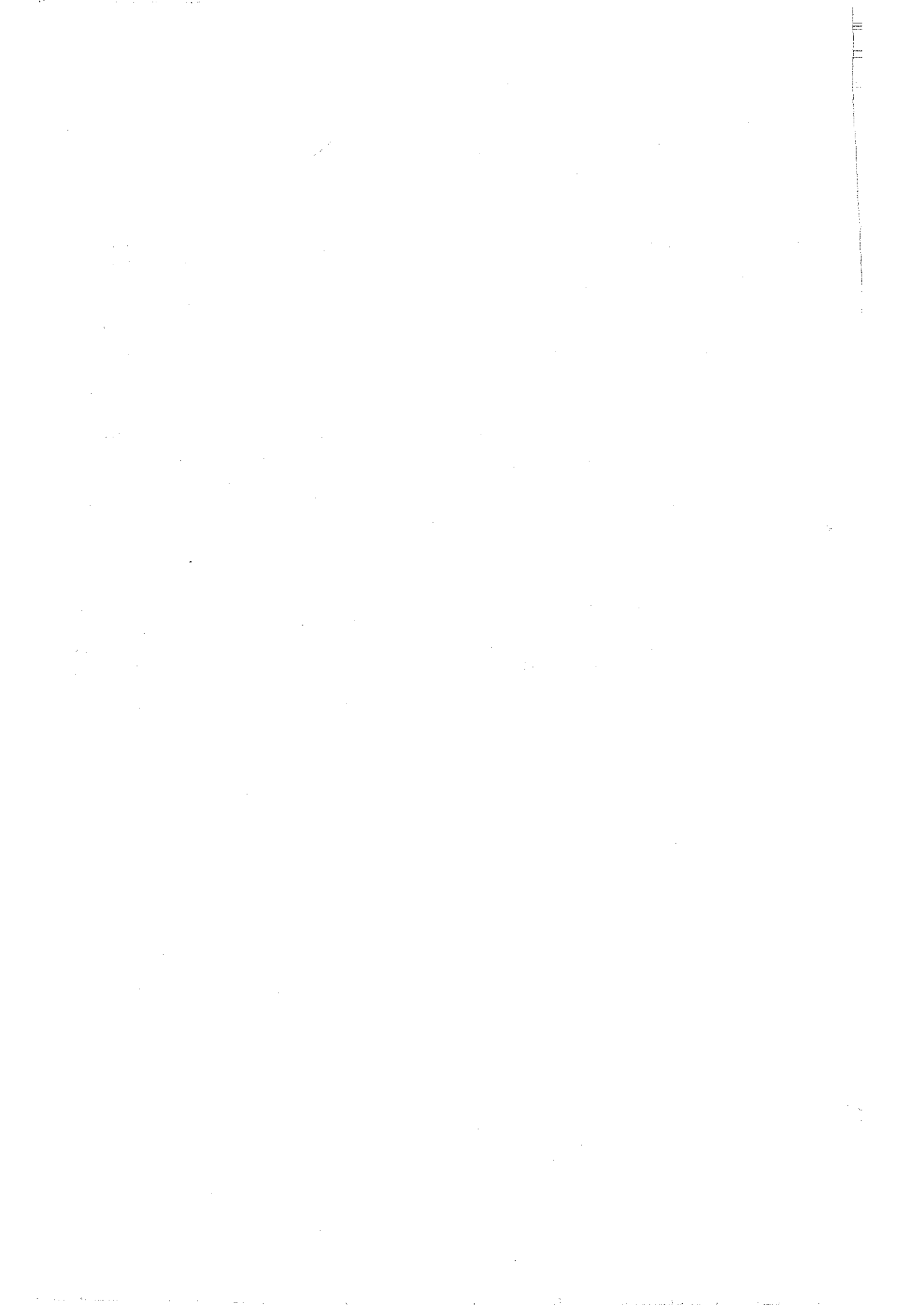
Max. Marks:100

**Note : Answer any FIVE full questions.**

- 1 a. What are the major differences between ANSI C and K and R 'C'? Explain with examples. (08 Marks)
- b. List at least four compile time limits along with their minimum values and explain their meaning. Write a 'C' program that displays the values of the above configuration limits using sysconf and pathconf functions. (08 Marks)
- c. Describe the characteristics of POSIX.1 FIPS standard. (04 Marks)
- 2 a. Explain five different file types that are supported on UNIX along with the procedure to create the file of each type. (08 Marks)
- b. Explain the UNIX kernel support files with a neat diagram. (08 Marks)
- c. Write a program in C/C++ to emulate the UNIX ln command. (04 Marks)
- 3 a. What is file and record locking? Explain with fcntl system call. Write a program in C/C++ to set an exclusive lock on the entire file using fcntl system call. If fcntl fails, find out who has locked the file and display all the lock information to the standard output. (10 Marks)
- b. Explain the following API's along with their prototype definitions :  
 i) open    ii) lseek    iii) fstat (06 Marks)
- c. Write a program in C/C++ to implement UNIX chown program (04 Marks)
- 4 a. Describe how a 'C' program is started and how it is terminated with a neat block diagram and also demonstrate the use of atexit function by writing the program of exithandlers. (08 Marks)
- b. With a neat block diagram explain the UNIX kernel support for processes. (08 Marks)
- c. Explain the memory layout of a 'C' program with a neat diagram. (04 Marks)
- 5 a. What is fork and vfork? Explain with an example program for each. (06 Marks)
- b. How many processes are created by executing the following program excluding the parent process?  

```
int main(void)
{
    for (int i = 0 ; i < 3 ; ++i)
        fork() ;
    return 0;
}
```

(02 Marks)
- c. What is a zombie process? What is the overhead associated with zombies? (04 Marks)
- d. Explain 6 different exec functions. Describe how their functionality differ from each other. Write a program in C/C++ that executes an interpreter file. (08 Marks)
- 6 a. What is meant by job control? What support is required for job control, explain with an example. (10 Marks)
- b. What is a signal? Explain the different dispositions of a signal when it occurs. When do you say a signal is pending? Write a program in C/C++ that masks SIG-PIPE and SIG-ABORT signals, check if they are pending. If they are pending, unmask and service them. (10 Marks)
- 7 a. What is a daemon process? Discuss the basic coding rules, along with the code to create a daemon process. (10 Marks)
- b. What is FIFO? Explain how it is used in IPC (interprocess communication). Discuss with an example the client/server communication using FIFO's. (10 Marks)
- 8 a. Explain identifier, key and permission structure of IPC. (10 Marks)
- b. Explain popen and pclose functions with their prototypes and a program in C/C++ to demonstrate the popen and pclose functions. (10 Marks)





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CS61

**Sixth Semester B.E. Degree Examination, June/July 08**  
**UNIX System Programming**

Time: 3 hrs.

Max. Marks:100

**Note :** Answer any FIVE full questions.

- 1 a. Explain POSIX feature test macros. (10 Marks)  
b. Explain UNIX kernel support for files with neat block diagram. (10 Marks)
- 2 a. Explain following APJ's with prototypes: i) Open ii) Creat iii) Read iv) Write. (08 Marks)  
b. Bring out the differences between hardlink and symbolic link. (06 Marks)  
c. Describe FIFO and device file classes. (06 Marks)
- 3 a. Explain file and record locking. (08 Marks)  
b. Illustrate the usage of mkfifo and mknod system calls. (06 Marks)  
c. Explain five different ways of process termination. (06 Marks)
- 4 a. Explain with an example the use of setjmp and longjmp functions. (10 Marks)  
b. Explain fork and vfork system calls. When does fork system call fail? (10 Marks)
- 5 a. Explain different exec functions. Write a program in C to demonstrate the exec function. (10 Marks)  
b. Explain process accounting structure in UNIX with an example. (10 Marks)
- 6 a. Explain process groups and sessions. (08 Marks)  
b. Explain job control with an example. (08 Marks)  
c. Show the state of processes after login has been invoked. (04 Marks)
- 7 a. Explain duemon characteristics and coding rules with an example. (10 Marks)  
b. Explain UNIX kernel support for handling different signals. (10 Marks)
- 8 a. Explain popen and pclose functions. (08 Marks)  
b. Explain message queue with a neat diagram. (06 Marks)  
c. Explain client-server communication using FIFO. (06 Marks)

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**Sixth Semester B.E. Degree Examination, June-July 2009**  
**Unix Systems Programming**

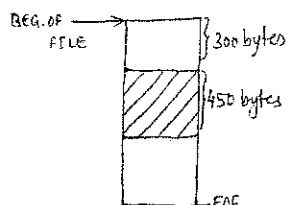
Time: 3 hrs.

Max. Marks:100

Note: 1. Answer any FIVE full questions, selecting  
 at least TWO questions from each part.  
 2. Programs must be neatly documented.

**PART – A**

- 1 a. Bring out the importance of standardizing the Unix operating systems. What aspects of C programming language have been standardized in ANSIC? With suitable examples, bring out the two important differences between K and R C and ANSIC with respect to function prototyping and pointers to functions. (08 Marks)
- b. What do you understand by the term feature test macros? List all the five feature test macros along with their meanings. (06 Marks)
- c. Write a C++ program to list the actual values of the following system configuration limits on a given Unix OS.
  - i) Maximum no. of child processes that can be created.
  - ii) Maximum no. of files that can be opened simultaneously.
  - iii) Maximum no. of message queues that can be accessed. (06 Marks)
- 2 a. What are APIs? When do you use them? Why are the APIs more time consuming than the library functions? (03 Marks)
- b. What are the API common characteristics? List any four values of the global variable errno along with their meaning wherever the APIs fail. (05 Marks)
- c. List all the file attributes along with their meaning. Which of these attributes can't be changed and why? List the commands needed to change the following file attributes.
  - i) File size; ii) User ID; iii) Last access and modification time; iv) Hard link count. (05 Marks)
- d. What is an inode? Why are the inodes unique only within a file system? How does OS map the inode to its filename? Bring out the four important differences between soft and hard links. (07 Marks)
- 3 a. List the structure used to query the file attributes in Unix. Write a program in C++ to list the following file attributes of a given regular file passed as command line argument.
  - i) File type      ii) Hard link count      iii) File size      iv) File name. (08 Marks)
- b. Describe the open API, clearly indicating its prototype declaration, the values the arguments take along with their meaning. Give two instances, when open API can fail. List all the access modifier flags and explain their meanings. (06 Marks)
- c. List the important uses of fcntl API. Give its prototype description. Write a C++ program to check whether the close – on – exec flag is set for a given file. If it is not set, use fcntl to set this flag. Also show the implementation of dupz macro using this API. (06 Marks)
- 4 a. Bring out the importance of locking files. What are mandatory and advisory locks? Why is advisory lock considered safe? What is the drawback of advisory lock? Explain in brief. (05 Marks)
- b. In a certain application, it is required to lock the hatched portion of the file as shown in Fig.4(b). Before locking the program must query the OS to see if some other process has locked the file. If yes, give the details of the locked portion and the PID of the process. Once the lock is obtained perform a write and unlock the file. Write a C++ program to implement this application. Assume suitable lock type. (06 Marks)



File name = "test.txt"

Fig.4(b). Region to be locked.

- c. What are the different ways in which a process can terminate? With a neat block schematic explain how a process is launched and terminated clearly indicating the role of C – startup routine and the exit handlers. (05 Marks)
- d. With a neat diagram, explain the memory layout of a C program. In which segments are the automatic variables and dynamically created objects are stored? (04 Marks)

### PART - B

- 5 a. With a prototype description of fork, explain the special features of this API. Write a program to create a child process and print the PPID and PID in the child process. The parent process must ensure that the child doesn't become a zombie process. The parent process must wait for the child and print exit status of the child using appropriate macros. (06 Marks)
- b. Explain in brief, what happens when exec is called in a child process. List the 6 different forms of exec APIs. Write a program that execs a program echoall to display all the command line and environment variables when this program is executed in the child process space. (06 Marks)
- c. With a neat block schematic, explain the terminal login process in BSD Unix. What is a session? Explain how do you create a session using appropriate shell commands. (04 Marks)
- d. What is job control? What are the three forms of support from the OS required for job control? (04 Marks)
- 6 a. What are signals? Mention the different sources of signals. What are the three disposition the process has when signals occur? List any four signals along with one or two line explanation. Write a program to setup signals handlers for SIGINT and SIGALRM signals. (08 Marks)
- b. Describe the API used to mask the signals. What are signal sets? List the functions that are used to manipulate the signal sets. Write a program to demonstrate the use of sigprocmask and sigpending functions. (06 Marks)
- c. What are daemon processes? Enlist their characteristics. Also write a program to transform a normal user process into a daemon process. Explain every step in the program. (06 Marks)
- 7 a. What are pipes? What are their limitations? Write a C program that sends "Hello world" message to the child process through the pipe. The child on receiving this message should display it on the standard output. (06 Marks)
- b. With a neat block schematic, explain how FIFO can be used to implement client – server communication model. (04 Marks)
- c. What are the three different ways in which the client and server processes can get access to same IPC structure? List the APIs along with their argument details that are used to create control, send and receive messages from a message queue. (07 Marks)
- d. What are semaphores? What is their purpose? List and explain the APIs used to create and control the semaphores. (03 Marks)
- 8 a. What is a socket? Describe the socket API. Write a C program to illustrate the process of creating socket, initializing the socket address structure and establishing a connection from client to the server. Assume the server IP address as 10.10.2.5 and port number = 8000. The client after establishing a connection, should send "Hello World" message and wait for reply. (08 Marks)
- b. What is out – of – band data? Illustrate with an example, how would you specify out – of – band data. (03 Marks)
- c. Write short notes on the following:
- i) Sigsetjmp and Siglongjmp
  - ii) Race conditions;
  - iii) Error logging facility in BSD Unix. (09 Marks)

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**Sixth Semester B.E. Degree Examination, June-July 2009**  
**UNIX Systems Programming**

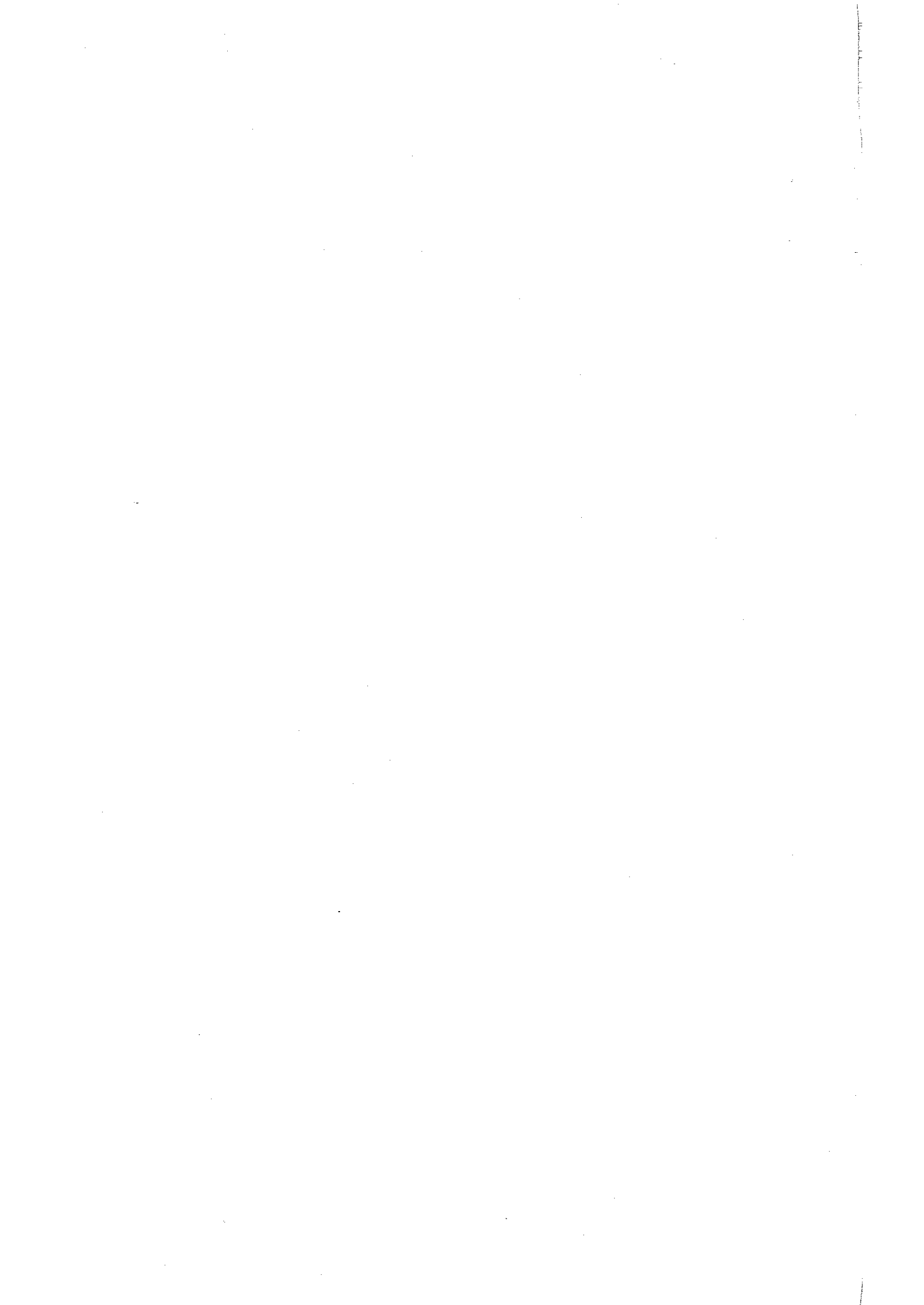
Time: 3 hrs.

Max. Marks:100

*Note: Answer any FIVE full questions.*

- 1 a. What is POSIX standard? Explain the different subsets of POSIX standards. Write the structure of the program to filter non-POSIX complaint codes from a user program. (06 Marks)
- b. Write C/C++ program to check the following:
  - i) Clock ticks
  - ii) Maximum number of child processes
  - iii) Maximum characters in a file name
  - iv) Maximum path length. (08 Marks)
- c. What is an API? How are they different from 'C' library functions? Calling an API is more time consuming than calling a user function. Justify or Contradict. (06 Marks)
- 2 a. What are the different types of files available in UNIX or POSIX? Explain different commands used to create each type with there argument values. (10 Marks)
- b. Explain the actions taken by the kernel when a process calls the open function to open a file. (10 Marks)
- 3 a. Explain how fcntl API can be used for file and record locking. (10 Marks)
- b. Write a program, in C/C++ to emulate the UNIX 'ln' command. (05 Marks)
- c. Differentiate between hard and symbolic link with an example. (05 Marks)
- 4 a. Explain briefly the memory layout of a 'C' program. (06 Marks)
- b. What is fork and vfork? Explain with an example for each. (06 Marks)
- c. Explain different exec functions. How are they differing from each other? (08 Marks)
- 5 a. What is job control? Summarize the job control features with the help of a figure. (10 Marks)
- b. Explain in detail the terminal login and network login. (10 Marks)
- 6 a. What is a signal? Explain the use of signal mask with examples. (10 Marks)
- b. What is a daemon? Give its basic coding rules. (10 Marks)
- 7 a. What is message queue? Explain client-server communications using a message queue. (10 Marks)
- b. What is a semaphore? Give system V semaphore characteristics and its use for IPC. (10 Marks)
- 8 Write short notes on:
  - a. Race condition
  - b. Zombie process
  - c. Client-server connection functions
  - d. Co-processes. (20 Marks)

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# 2002 SCHEME

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CS61

Sixth Semester B.E. Degree Examination, Dec.09-Jan.10

## UNIX Systems Programming

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

- 1 a. What is the need for standardization of UNIX and C programming language? Bring out the major differences between ANSI C and K + R C with examples. (08 Marks)
- b. Write a C/C++ POSIX compliant program to check the following limits :
  - i) Maximum number of child processes
  - ii) Maximum path length
  - iii) Maximum characters in a file name
  - iv) Maximum number of open files per process. (08 Marks)
- c. Explain POSIX. IFIPS standard. (04 Marks)
- 2 a. Explain the different file types available in UNIX or POSIX systems. (08 Marks)
- b. Explain with example the following API's with its prototype.
  - i) open ii) creat iii) read iv) fcntl. (08 Marks)
- c. Write a program in C/C++ to emulate the UNIX ln command. (04 Marks)
- 3 a. What are pipes? Explain with an example the use of lseek, unlink and access with their prototypes and argument values. (12 Marks)
- b. What are the different ways for a process to terminate? Explain exit, -exit and at exit function with its prototype. (08 Marks)
- 4 a. Explain six different 'exec' functions. Describe how they differ from each other write a program that execs an interpreter file. (10 Marks)
- b. What is zombie process? Write a C /C++ program to avoid zombie process by forking twice. (10 Marks)
- 5 a. What is meant by job control? What support is required for job control? Explain with example. (10 Marks)
- b. Explain how UNIX operating system keeps process accounting. (10 Marks)
- 6 a. What is a signal? Discuss any five POSIX – defined signals. Explain how to set up a signal handler. (10 Marks)
- b. Discuss Daemon characteristics and coding rules. (10 Marks)
- 7 a. Explain the UNIX Kernel support for messages. Show the related data structure. (10 Marks)
- b. Explain popen and pclose functions with prototypes and write a program to demonstrate the popen and pclose functions. (10 Marks)
- 8 Write short notes on (Any Four) of the following :
  - a. Race condition
  - b. Network Login
  - c. Environment List
  - d. Semaphores
  - e. Client – server interaction. (20 Marks)

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