



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

Hingna Road, Wanadongri, Nagpur - 441 110

Ph.: 07104-237919, 234623, 329249, 329250 Fax: 07104-232376, Website: www.ycce.edu

Department of Computer Science and Engineering (IOT)

YCCE

Vision

"To become the most preferred institution providing innovative, research and value based, professional education for the society at large".

Mission

YCCE is committed to

- Attract best talent and create learning ambience
- Practice Innovative teaching-learning & research
- Integrate Industry-Institute Collaborations
- Nurture students towards holistic development and choicest career

Department

Vision of the Department

To be a well-known center for pursuing computer education through innovative pedagogy, value-based education and industry collaboration.

Mission of the Department

To establish learning ambience for ushering in computer engineering professionals in core and multidisciplinary arena by developing problem-solving skills through emerging technologies.



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

Hingna Road, Wanadongri, Nagpur - 441 110

Ph.: 07104-237919, 234623, 329249, 329250 Fax: 07104-232376, Website: www.ycce.edu

Department of Computer Science and Engineering (IOT)

23CT1402	Lab: Operating Systems
Name of the Student: Parth Bhedurkar	Semester/ Section: 5A
Roll No: 52	Enrollment Number: 23071495

Sr. No.	COs	POs												PSOs	
		Course Outcomes	1	2	3	4	5	6	7	8	9	10	11	PSO 1	PSO2
1	CO1	Demonstrate the ability to execute Linux process management, memory management, and shell commands to system manage resources efficiently.	3	3	3	-		-	-	-	-	-	3	3	
2	CO2	Develop programs utilizing system calls, thread programming, and page replacement algorithms to simulate and analyze operating system functionalities.	3	3	3	-	-	-	-	-	-	-	3	3	
3	CO3	Design and implement process scheduling, memory allocation, deadlock detection algorithms to address real-world operating system challenges.	3	3	3	-		-	-	-	-	-	3	3	
		Avg		3	3	-		-	-	-	-	-	3	3	



Aim::Execute linux system calls process management ,memory management , file managment system calls

Theory:

Processmanagement:

This system calls perform the task of process creation, process termination, etc. The Linux Systemcalls under this are fork() , exit() , exec().

- **fork():**

- o A new process is created by the fork() system call.
- o A new process may be created with fork() without a new program being run-the new sub-process simply continues to execute exactly the same program that the first (parent) process was running.
- o It is one of the most widely used system calls under process management.

- **exit():**

- o The exit() system call is used by a program to terminate its execution.
- o The operating system reclaims resources that were used by the process after the exit() system call.

- **exec():**

- o A new program will start executing after a call to exec()
- o Running a new program does not require that a new process be created first: any o process may call exec() at any time. The currently running program is immediately terminated, and the new program starts executing in the context of the existing process.

- **File Management :**

File management system calls handle file manipulation jobs like creating a file, reading, and writing, etc. The Linux System calls under this are open(), read(),write(), close()

- **open():**

- o It is the system call to open a file.
- o This system call just opens the file, to perform operations such as read and write, we need to execute different system call to perform the operations.

- **read():**

- o This system call opens the file in reading mode
- o We can not edit the files with this system call.
- o Multiple processes can execute the read() system call on the same file

simultaneously.



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

Hingna Road, Wanadongri, Nagpur - 441 110

Ph.: 07104-237919, 234623, 329249, 329250 Fax: 07104-232376, Website: www.ycce.edu

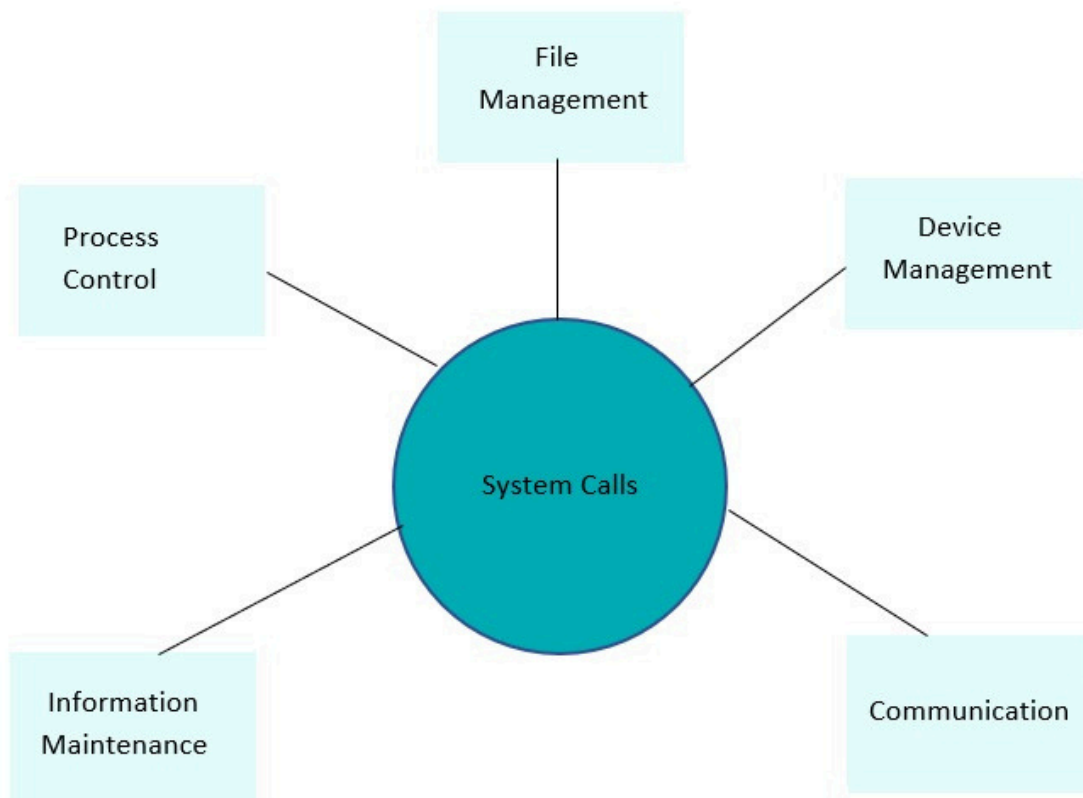
Department of Computer Science and Engineering (IOT)

• write():

- This system call opens the file in writing mode
- We can edit the files with this system call.
- Multiple processes can not execute the write() system call on the same file simultaneously.

• close():

- This system call closes the opened file.





Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

Hingna Road, Wanadongri, Nagpur - 441 110

Ph.: 07104-237919, 234623, 329249, 329250 Fax: 07104-232376, Website: www.ycce.edu

Department of Computer Science and Engineering (IOT)

Source Code:

File Name:

Sample code 1:

```
#include <stdio.h>
#include <sys/types.h>
#include <unistd.h>
int main()
{
    fork();    fork();
    fork();
    printf("hello\n");
    return 0;

}
```

Sample code 2:

```
#include <stdio.h>
#include <stdlib.h>
#include <sys/types.h>
#include <unistd.h>

int main() {
    pid_t p = fork();
    if (p == -1) {
        perror("fork failed");
        return 1;
    } else if (p == 0) {
        printf("Hello from child! My id is %d\n", getpid());
    } else {
        printf("Hello from parent! My id is %d\n", getpid());
    }
    return 0;
}
```



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

Hingna Road, Wanadongri, Nagpur - 441 110

Ph.: 07104-237919, 234623, 329249, 329250 Fax: 07104-232376, Website: www.ycce.edu

Department of Computer Science and Engineering (IOT)

File Management 3:

```
#include <fcntl.h> // For open()
#include <unistd.h> // For write() and close()
#include <string.h> // For strlen()

int main() {
    int fd = open("example.txt", O_WRONLY | O_CREAT | O_TRUNC, 0644);
    if (fd < 0) {
        // Error handling
        return 1;
    }
    write(fd, "Hello, file system!\n", strlen("Hello, file system!\n"));
    close(fd);
    return 0;
}
```



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

Hingna Road, Wanadongri, Nagpur - 441 110

Ph.: 07104-237919, 234623, 329249, 329250 Fax: 07104-232376, Website: www.ycce.edu

Department of Computer Science and Engineering (IOT)

OUTPUT (SCREEN SHOT) IF ANY:

Sample Output 1:

```
main.c [Run] [Clear]
1 #include <stdio.h>
2 #include <sys/types.h>
3 #include <unistd.h>
4 int main()
5 {
6     fork();
7     fork();
8     fork();
9     printf("hello\n");
10    return 0;
11 }
```

Output

```
hello
hello
hello
hello
hello
hello
hello

=== Code Execution Successful ===
```

Sample output 2:

```
main.c [Run] [Clear]
1 #include <stdio.h>
2 #include <stdlib.h>
3 #include <sys/types.h>
4 #include <unistd.h>
5
6 int main() {
7     pid_t p = fork();
8
9     if (p == -1) {
10        perror("fork failed");
11        return 1;
12    } else if (p == 0) {
13        printf("Hello from child! My id is %d\n", getpid());
14    } else {
15        printf("Hello from parent! My id is %d\n", getpid());
16    }
17
18    return 0;
19 }
20
```

Output

```
Hello from parent! My id is 43566
Hello from child! My id is 43567

=== Code Execution Successful ===
```



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

Hingna Road, Wanadongri, Nagpur - 441 110

Ph.: 07104-237919, 234623, 329249, 329250 Fax: 07104-232376, Website: www.ycce.edu

Department of Computer Science and Engineering (IOT)

File Management 3:

The screenshot displays a C program for file management, titled "File Management 3:". The code is written in a text editor with a dark background and syntax highlighting. The code includes headers for `<fcntl.h>`, `<unistd.h>`, and `<string.h>`. It defines a `main` function that opens a file named "example.txt" in write mode, writes the string "Hello, file system!\n", and then closes the file. The program returns 0.

```
1 #include <fcntl.h> // For open()
2 #include <unistd.h> // For write() and close()
3 #include <string.h> // For strlen()
4
5 int main() {
6     int fd = open("example.txt", O_WRONLY | O_CREAT | O_TRUNC, 0644);
7     if (fd < 0) {
8         // Error handling
9         return 1;
10    }
11
12    write(fd, "Hello, file system!\n", strlen("Hello, file system!\n"));
13    close(fd);
14    return 0;
15 }
16
```

The output of the program is shown in a terminal window below the code editor. It displays the message "Hello, file system!" followed by a newline character.

```
...Program finished with exit code 0
Press ENTER to exit console.
```

The terminal window also shows the message "Hello, file system!" followed by a newline character.

The interface includes a toolbar with buttons for Run, Debug, Stop, Share, Save, and Beautify. The language is set to C. An advertisement for Auth0 is visible on the right side of the interface.



Nagar Yuwak Shikshan Sanstha's

Yeshwantrao Chavan College of Engineering

(An Autonomous Institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

Hingna Road, Wanadongri, Nagpur - 441 110

Ph.: 07104-237919, 234623, 329249, 329250 Fax: 07104-232376, Website: www.ycce.edu

Department of Computer Science and Engineering (IOT)

Conclusion:

By running these programs, we learned how the Linux kernel provides low-level control over processes, memory, and file operations through system calls.