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## C program to demonstrate fork() and pipe()



Write Linux C program to create two processes P1 and P2. P1 takes a string and passes it to P2. P2 concatenates the received string with another string without using string function and sends it back to P1 for printing.

Examples:

Other string is: *forgeeks.org*

Input : *www.geeks*

Output : *www.geeksforgeeks.org*

Input : *www.practice.geeks*

Output : *practice.geeksforgeeks.org*

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#### Explanation:

- To create child process we use fork(). fork() returns :
  - **<0** fail to create child (new) process
  - **=0** for child process
  - **>0** i.e process ID of the child process to the parent process.

When >0 parent process will execute.

- pipe() is used for passing information from one process to another. pipe() is unidirectional therefore, for two-way communication between processes, two pipes can be set up, one for each direction.

#### Example:

```
int fd[2];  
pipe(fd);  
fd[0]; //-> for using read end  
fd[1]; //-> for using write end
```

**Inside Parent Process :** We firstly close the reading end of first pipe (fd1[0]) then write the string through writing end of the pipe (fd1[1]). Now parent will **wait** until child process is finished. After the child

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process, parent will close the writing end of second pipe(fd2[1]) and read the string through reading end of pipe (fd2[0]).

**Inside Child Process :** Child reads the first string sent by parent process by closing the writing end of pipe (fd1[1]) and after reading concatenate both string and passes the string to parent process via fd2 pipe and will exit.



// C program to demonstrate use of fork() and pipe



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



```
#include<stdlib.h>
```



```
#include<unistd.h>
```



```
#include<sys/types.h>
```

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

```
#include<sys/wait.h>
```

```
int main()  
{
```

```
    // We use two pipes
```

```
    // First pipe to send input string from parent
```

```
    // Second pipe to send concatenated string from
```

```
    int fd1[2]; // Used to store two ends of first
```

```
    int fd2[2]; // Used to store two ends of second
```

```
    char fixed_str[] = "forgeeks.org";
```

```
    char input_str[100];
```

```
    pid_t p;
```

```
    if (pipe(fd1)==-1)
```

```
    {
```

```
        fprintf(stderr, "Pipe Failed" );
```

```
        return 1;
```

```
    }
```

```
    if (pipe(fd2)==-1)
```

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```
{
    fprintf(stderr, "Pipe Failed" );
    return 1;
}

scanf("%s", input_str);
p = fork();

if (p < 0)
{
    fprintf(stderr, "fork Failed" );
    return 1;
}

// Parent process
else if (p > 0)
{
    char concat_str[100];

    close(fd1[0]); // Close reading end of file

    // Write input string and close writing end of
    // pipe.
    write(fd1[1], input_str, strlen(input_str));
    close(fd1[1]);

    // Wait for child to send a string
    wait(NULL);

    close(fd2[1]); // Close writing end of second pipe

    // Read string from child, print it and close
    // reading end.
    read(fd2[0], concat_str, 100);
    printf("Concatenated string %s\n", concat_str);
    close(fd2[0]);
}
```

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```

// child process
else
{
    close(fd1[1]); // Close writing end of file

    // Read a string using first pipe
    char concat_str[100];
    read(fd1[0], concat_str, 100);

    // Concatenate a fixed string with it
    int k = strlen(concat_str);
    int i;
    for (i=0; i<strlen(fixed_str); i++)
        concat_str[k++] = fixed_str[i];

    concat_str[k] = '\\0'; // string ends with \\0

    // Close both reading ends
    close(fd1[0]);
    close(fd2[0]);

    // Write concatenated string and close writing end
    write(fd2[1], concat_str, strlen(concat_str));
    close(fd2[1]);

    exit(0);
}
}

```

Input : www.geeks

Output : Concatenated string  
www.geeksforgeeks.org

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### References:

<http://www.csl.mtu.edu/cs4411.ck/www/NOTES/process/fork/create.html>

<http://www.csl.mtu.edu/cs4411.ck/www/NOTES/process/fork/wait.html>

<http://searchenterpriselinux.techtarget.com/definition/pipe>

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