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1.   **"The child "exec" call inherits the file descriptors of parent if Close_on_exec is not set". Demonstrate with an example.**

Program:-

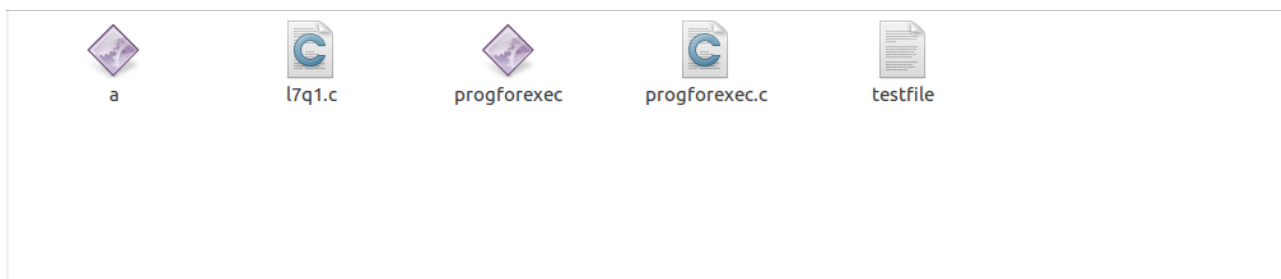```c
#include <unistd.h>
#include <sys/types.h>
#include <sys/stat.h>
#include <fcntl.h>
#include <stdio.h>
#include <stdlib.h>

int main() {
    int fd;
    pid_t pid;
    fd = open("testfile", O_RDWR | O_CREAT, 0777);
    if(fd == -1) {
        printf("open failed\n");
    }
    write(fd, "This is a line added by parent.\n", 32);
    //we will check default status of close on exec flag
    int val = fcntl(fd, F_GETFD);
    if(val) {
        printf("close on exec is set :- %d\n", val);
    }
    else {
        printf("close on exec is not set\n");
    }
    if((pid = fork()) < 0) {
        printf("fork failed\n");
    }
    else if(pid == 0) {
        char buff[20];
        snprintf(buff, 20, "%d", fd);
        printf("%s\n", buff);
        if(execl("progforexec", "progforexec", buff, (char*)NULL) == -1) {
            printf("exec failed\n");
        }
    }
    return 0;
}
```

**Program used for execution in child :-**

```
1  #include <unistd.h>
2  #include <sys/types.h>
3  #include <sys/stat.h>
4  #include <fcntl.h>
5  #include <stdio.h>
6  #include <string.h>
7  #include <stdlib.h>
8
9  int main(int argc, char *argv[]) {
10      int fd = atoi(argv[1]);
11      if(write(fd, "This is line written by program executed in child using exec().\n",
12              strlen("This is line written by program executed in child using exec().\n")) < 0) {
13          printf("Demonstration failed\n");
14      }
15      else {
16          printf("The child "exec" call inherits the file descriptors of parent if Close_on_exec is not set : Demonstation successfull\n");
17          exit(0);
18      }
19      return 0;
20  }
```

Directory contents:-

a   l7q1.c   progforexec   progforexec.c   testfile

Execution:-

```
anupam@anupam-Inspiron-7548:~/aup$ cc l7q1.c -o a
anupam@anupam-Inspiron-7548:~/aup$ ./a
close on exec is not set
3
The child "exec" call inherits the file descriptors of parent if Close_on_exec is not set : Demonstation successfull
anupam@anupam-Inspiron-7548:~/aup$ 
```

Explanation:-

As close on exec flag is not set all the file descriptors open in parent are inherited by child exec() call. This can be demonstrated by,
1) Creating a new file in parent and writing some content to the file.
2) Passing the file descriptor as an argument to the program to be executed.
3) Using the same descriptor in the program that is executed using exec to see if it can be used to write/read from the same file.

As demonstrated in above program output, we can see that the file was created by parent program and the file descripted was passed to the program to be executed. The program to be executed used the file descriptor to write some content in file which was successfull. Hence we

can conclude that, "The child "exec" call inherits the file descriptors of parent if Close_on_exec is not set".