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Assignment 1 – Study of System Calls and System Commands

1. (Observation)

2. Develop a C program to understand the working of fork().

Code:

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

#define   MAX_COUNT  200

void  ChildProcess(void);
/* child process prototype  */

void  ParentProcess(void);
/* parent process prototype */

void  main(void) {
        pid_t  pid;
        pid = fork();
        if (pid == 0)
                ChildProcess();
        else
                ParentProcess();
        }

void  ChildProcess(void) {
        int   i;
        for (i = 1; i <= MAX_COUNT; i++)
                printf("\tThis line is from child, value = %d\n", i);
        printf("\t*** Child process is done ***\n");
        }

void  ParentProcess(void) {
        int   i;
        for (i = 1; i <= MAX_COUNT; i++)
                printf("This line is from parent, value = %d\n", i);
        printf("*** Parent is done ***\n");
        }
```

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Output:

```
kri@kri-ubuntu:~/workspace$ gcc -o fork fork_call.c
kri@kri-ubuntu:~/workspace$ ./fork
This line is from parent, value = 1
This line is from parent, value = 2
This line is from parent, value = 3
This line is from parent, value = 4
This line is from parent, value = 5
        This line is from child, value = 1
        This line is from child, value = 2
        This line is from child, value = 3
        This line is from child, value = 4
This line is from parent, value = 6
        This line is from child, value = 5
This line is from parent, value = 7
        This line is from child, value = 6
This line is from parent, value = 8
        This line is from child, value = 7
This line is from parent, value = 9
        This line is from child, value = 8
This line is from parent, value = 10
        This line is from child, value = 9
This line is from parent, value = 11
        This line is from child, value = 10
This line is from parent, value = 12
        This line is from child, value = 11
This line is from parent, value = 13
        This line is from child, value = 12
This line is from parent, value = 14
        This line is from child, value = 13
This line is from parent, value = 15
        This line is from child, value = 14
This line is from parent, value = 16
        This line is from child, value = 15
This line is from parent, value = 17
        This line is from child, value = 16
This line is from parent, value = 18
        This line is from child, value = 17
This line is from parent, value = 19
        This line is from child, value = 18
This line is from parent, value = 20
        This line is from child, value = 19
This line is from parent, value = 21
        This line is from child, value = 20
This line is from parent, value = 22
        This line is from child, value = 21
This line is from parent, value = 23
        This line is from child, value = 22
This line is from parent, value = 24
        This line is from child, value = 23
This line is from parent, value = 25
        This line is from child, value = 24
This line is from parent, value = 26
        This line is from child, value = 25
This line is from parent, value = 27
        This line is from child, value = 26
This line is from parent, value = 28
        This line is from child, value = 27
This line is from parent, value = 29
        This line is from child, value = 28
This line is from parent, value = 30
        This line is from child, value = 29
This line is from parent, value = 31
        This line is from child, value = 30
This line is from parent, value = 32
        This line is from child, value = 31
This line is from parent, value = 33
        This line is from child, value = 32
This line is from parent, value = 34
        This line is from child, value = 33
This line is from parent, value = 35
        This line is from child, value = 34
This line is from parent, value = 36
        This line is from child, value = 35
This line is from parent, value = 37
        This line is from child, value = 36
This line is from parent, value = 38
        This line is from child, value = 37
This line is from parent, value = 39
        This line is from child, value = 38
This line is from parent, value = 40
        This line is from child, value = 39
This line is from parent, value = 41
        This line is from child, value = 40
This line is from parent, value = 42
        This line is from child, value = 41
This line is from parent, value = 43
        This line is from child, value = 42
This line is from parent, value = 44
        This line is from child, value = 43
This line is from parent, value = 45
        This line is from child, value = 44
This line is from parent, value = 46
        This line is from child, value = 45
This line is from parent, value = 47
        This line is from child, value = 46
This line is from parent, value = 48
        This line is from child, value = 47
This line is from parent, value = 49
        This line is from child, value = 48
This line is from parent, value = 50
```

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```
        This line is from child, value = 49
This line is from parent, value = 51
        This line is from child, value = 50
This line is from parent, value = 52
        This line is from child, value = 51
This line is from parent, value = 53
        This line is from child, value = 52
This line is from parent, value = 54
        This line is from child, value = 53
This line is from parent, value = 55
        This line is from child, value = 54
This line is from parent, value = 56
        This line is from child, value = 55
This line is from parent, value = 57
        This line is from child, value = 56
This line is from parent, value = 58
        This line is from child, value = 57
This line is from parent, value = 59
        This line is from child, value = 58
This line is from parent, value = 60
        This line is from child, value = 59
This line is from parent, value = 61
        This line is from child, value = 60
This line is from parent, value = 62
        This line is from child, value = 61
This line is from parent, value = 63
        This line is from child, value = 62
This line is from parent, value = 64
        This line is from child, value = 63
This line is from parent, value = 65
        This line is from child, value = 64
This line is from parent, value = 66
        This line is from child, value = 65
This line is from parent, value = 67
        This line is from child, value = 66
This line is from parent, value = 68
        This line is from child, value = 67
This line is from parent, value = 69
```

.

.

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```
        This line is from child, value = 183
This line is from parent, value = 184
        This line is from child, value = 184
This line is from parent, value = 185
        This line is from child, value = 185
This line is from parent, value = 186
        This line is from child, value = 186
This line is from parent, value = 187
        This line is from child, value = 187
This line is from parent, value = 188
        This line is from child, value = 188
This line is from parent, value = 189
        This line is from child, value = 189
This line is from parent, value = 190
        This line is from child, value = 190
This line is from parent, value = 191
        This line is from child, value = 191
This line is from parent, value = 192
        This line is from child, value = 192
This line is from parent, value = 193
        This line is from child, value = 193
This line is from parent, value = 194
        This line is from child, value = 194
This line is from parent, value = 195
        This line is from child, value = 195
This line is from parent, value = 196
        This line is from child, value = 196
This line is from parent, value = 197
        This line is from child, value = 197
This line is from parent, value = 198
        This line is from child, value = 198
This line is from parent, value = 199
        This line is from child, value = 199
This line is from parent, value = 200
        This line is from child, value = 200
*** Parent is done ***
        *** Child process is done ***
```

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3. Develop a C program using system calls to open a file, read the contents of the same, display it and close the file. Use command line arguments to pass the file name to the program.

Code:

```
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <dirent.h>
#include <fcntl.h>
#include <string.h>

#define MAX_LENGTH 100
#define MAX_BYTES 500

int main (int argc, char* argv[]){
	if (argc == 2){
		char src[MAX_LENGTH];
		strcpy(src,argv[1]);
		int src_fd, src_sz;
		char* content = (char *) calloc(100, sizeof(char));
		printf("\n");

		//find file desciptor for src file
		src_fd = open(src,O_RDONLY);
		//include error msg for case when src file not found
		if (src_fd < 0) { perror("Command unsuccessful. Source file not found."); exit(1); }

		//save the contents of src file in a string
		src_sz = read(src_fd,content,MAX_BYTES);
		content[src_sz] = '\0';

		//display the contents of the file by printing the string
		printf("%s\n",content);

		//close src file
		close(src_fd);
		}

	else if (argc > 2){
		printf("Too many arguments supplied.\n");
		}

	else {
		printf("An argument is expected.\n");
		}
	}
```

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Output:

```
kri@kri-ubuntu:~/workspace$ gcc -o readf readf.c
kri@kri-ubuntu:~/workspace$ ./readf
An argument is expected.
kri@kri-ubuntu:~/workspace$ ./readf arg1 arg2
Too many arguments supplied.
kri@kri-ubuntu:~/workspace$ ./readf randfile

Command unsuccessful. Source file not found.: No such file or directory
kri@kri-ubuntu:~/workspace$ ./readf foo.txt

This is the first line.
This is the second line.
.
.
.
This is the last line.

kri@kri-ubuntu:~/workspace$
```
