National University of Computer and Emerging Sciences

Laboratory Manual

for

Operating Systems Lab

(CL-220)

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Section	B
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Lab Topic:

- I/O Redirection

Lab Objectives:

- Input, and output redirection using Dup, Dup2 system calls.

1 "dup" System Call Manual

1.1 NAME

dup - Duplicate an open file descriptor

1.2 SYNOPSIS

```
#include <unistd.h>
int dup(int oldfd);
```

1.3 DESCRIPTION

The **dup** system call creates a new file descriptor that refers to the same open file description as the **oldfd** file descriptor. The new file descriptor is the lowest-numbered available descriptor.

1.4 PARAMETERS

- **oldfd**: The file descriptor to be duplicated.

1.5 RETURN VALUE

- On success, **dup** returns a new file descriptor that refers to the same file as **oldfd**. If an error occurs, it returns -1, and **errno** is set to indicate the error.

1.6 ERRORS

- **EBADF**: **oldfd** is not a valid file descriptor.
- **EMFILE**: The process has too many open file descriptors.
- Other errors as described in the **errno** documentation.

2 “dup2” System Call Manual

2.1 NAME

dup2 - Duplicate an open file descriptor to a specified file descriptor number

2.2 SYNOPSIS

```
#include <unistd.h>

int dup2(int oldfd, int newfd);
```

2.3 DESCRIPTION

The dup2 system call duplicates the file descriptor oldfd to newfd, allowing you to specify a particular file descriptor number for the duplication. If newfd is already in use, it is closed before the duplication occurs.

2.4 PARAMETERS

- **oldfd**: The file descriptor to be duplicated.
- **newfd**: The desired file descriptor number for the duplication.

2.5 RETURN VALUE

On success, **dup2** returns **newfd**, which is the duplicated file descriptor. If an error occurs, it returns -1, and **errno** is set to indicate the error.

2.6 ERRORS

- **EBADF**: **oldfd** is not a valid file descriptor, or **newfd** is negative or exceeds the maximum allowed file descriptor value.
- **EMFILE**: The process has too many open file descriptors.
- Other errors as described in the **errno** documentation.

Lab Questions:

Question 1 (I/O REDIRECTION using filing):

Write a program that takes that reads an input from file input.txt rather than a keyboard sum all the digits and write the sum to a new file output.txt rather than console.

(Hint: use Dup system call)

Question 2:

Write a cpp program that can perform the task of the below shell command.

man ls | grep ls > file.txt

(Hint: Pipes and execlp system call)

Note: you must submit the makefile of your code

You can get help from this link for makefile https://www.youtube.com/watch?v=_r7i5X0rXJk