Operating Systems, Security and Networks (207SE)
Lab 7: **Simple buffer exercise**

This week we will look at a simple buffer approach to copy a file from one location to another using a buffer. Like when you are using youtube to watch videos.

Setting up the activities

Getting to required file

- Run MobaXterm and connect to the server
- Get buffer.zip from moodle
- Drag buffer.zip into MobaXterm or using filezilla
- unzip buffer.zip
- cd buffer

Background Knowledge

- See lecture slides at end for a description on write/read and what the code does.

Tasks - File copying using a buffer

1. Comment the code below to indicate what different parts do.

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

#define BUF_SIZE 500
#define OUTPUT_MODE 0700

int main(int argc, char *argv[])
{
  int in_fd, out_fd;
  int rd_size = 1, wr_size;
  char buf[BUF_SIZE];

  if (argc != 3)
    exit(1);

  in_fd = open(argv[1], O_RDONLY);
  if (in_fd < 0)
    exit(2);

  out_fd = creat(argv[2], OUTPUT_MODE);
  if (out_fd < 0)
    exit(3);

  while (rd_size > 0) {
```

```
        rd_size = read(in_fd, buf, BUF_SIZE);
        if (rd_size <0)
          exit(4);

        wr_size = write(out_fd, buf, rd_size);
        if (wr_size<=0){
                close(in_fd);
                close(out_fd);
                exit(5);
              }
      }
}
```

2 . Update the code so it prints the error that has occurred or if a file has been successfully created and a copy of the review included in it.

Compile the code using **gcc –o buffer buffer.c** and run it by typing **./buffer review.txt hamlet.txt.**

What is in hamlet.txt?

Hint review.txt is a review of the latest production of Hamlet

3. Adapt the code to show how many characters were read in total, how many characters are read from the buffer at a time, how many words are in the document, and how many times the buffer is filled.

Hint: rd_size contains the number of characters in the buffer
Hint: read(in_fd, buf, BUF_SIZE) repeatedly reads characters from the input file into the buffer (buf)
A word will be followed by a space or a full-stop.

4. Alter BUF_SIZE to 2000. How does this influence the number of times the buffer is filled. Try different values for BUF_SIZE.

5. Adapt the code in buffer.c so it is possible to compare if two files are the same. If they are different say how they differ. Explain the approach for comparing the files and say why you feel it is an appropriate for comparing the files.

Compare **review.txt** and **hamlet.txt.**
Compare **hamlet.txt** and **review_observer.txt.**

Hint: You will need two buffers and to use a for loop to compare the content of the two buffers.

Evidence

The original code commented
Commented adapted code with outputs to show how many characters were read in total, the number of words, and how many times the buffer was filled.
The impact of different buffer sizes.
Commented adapted code with outputs to compare if two files are the same.

Marks

Activities 1+2 get up to 2/5,
Activities 1-4 gets up to 4/5
Activity 5 is required for 5/5