CSI 402 – Systems Programming – Handout 10.1
An Example using `open`, `read` and `write` System Calls

Note: The following example is a file copy program that uses calls to `open`, `read`, `write` and `close` functions. To run this program, you should first create the executable (say, `mycp`) and run the executable using a command of the form

`mycp` *infile* *outfile*

where the argument *infile* is the name of an existing file and *outfile* is the copy created by the program.

```
/* File copy program using open, read, write and close */
/* system calls.                                       */

/* Usage: mycp  infile   outfile  */

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

/* Buffer size for read/write. */
#define  BUFSIZE    512

/* No. of command line arguments. */
#define  NUMARG     3

/* Protection bits for new file. */
#define  FILE_MODE  0644

int  main(int argc, char *argv[]) {

  char buffer[BUFSIZE];  /* Buffer for read/write. */
  int  infd, outfd;      /* File descriptors for old and new files. */
  int  nread;            /* No. of bytes read each time. */
  int  nwrite;           /* No. of bytes written each time. */

  /* The command line must have exactly NUMARG arguments. */
  if (argc != NUMARG) {
     fprintf(stderr, "Usage: mycp  infile  outfile\n");
     exit(1);
  }
```

(over)

```
  /* Open the input and output files. */

  if ((infd = open(argv[1], O_RDONLY)) == -1) {
     fprintf(stderr, "Could not open file: %s\n", argv[1]);
     exit(1);
  }
  if ((outfd = open(argv[2], O_CREAT | O_WRONLY, FILE_MODE)) == -1) {
     fprintf(stderr, "Could not open file: %s\n", argv[2]);
     exit(1);
  }

  /* Read from input file and write to output file. (Each read/write, */
  /* except possibly the last, uses BUFSIZE bytes at a time.)         */

  while ((nread = read(infd, buffer, BUFSIZE)) > 0) {
     /* Write as many bytes as were read. */
     nwrite = write(outfd, buffer, nread);
     if (nwrite < nread) { /* Write error. */
        fprintf(stderr, "Error occurred while writing.\n");
        exit(1);
     }
  } /* End of while. */

  if (nread == -1) { /* Error in read. */
     fprintf(stderr, "Error occurred while reading.\n");
     exit(1);
  }

  /* File copied properly. Close the two files. */

  if (close(infd) == -1) { /* Error in closing input file. */
     fprintf(stderr, "Couldn't close file %s\n", argv[1]);
     exit(1);
  }
  if (close(outfd) == -1) { /* Error in closing output file. */
     fprintf(stderr, "Couldn't close file %s\n", argv[2]);
  }
  return 0;
} /* End of main. */
```