# Operating Systems   Project 2
**University at Albany**
**Department of Computer Science**
**CSI 500**

**Project 2**
**Assigned: Monday, February 21st, 2022**
**Due: Monday, February 28th by 11:59 PM. Submissions with 20% penalty will be
Accepted by Wednesday, March 2nd by 11:59 PM.**

**Purpose**
To develop an interprocess communication through the use of both fork() and pipe() process system calls.

**What to Do**
You are to modify Project 1 such that the data sharing between producer and consumer is done by reading and writing through a shared pipe. The data shared by the producer is encoded and shared with the consumer. The consumer decodes the message, modifies it, and saves it. The files containing the original data, the encoded version of it, and the modified version of it are to be stored in files with the extension *inpf*, *binf*, and *outf* respectively. Details regarding such files are provided by the table below.

| File Characteristics | | | |
|---|---|---|---|
| Naming | Contents | Created by | Accessed by |
| filename.inpf | any ASCII character | user | producer |
| filename.binf | (0 and 1) ASCII characters | producer | consumer |
| filename.outf | Modified version of .inpf | consumer | user |

### 1.  The Producer
Creates a pipe and uses it to share all the encoded frames with the consumer in addition to all the other tasks defined in the Project 1 document.

### 2. The Consumer
In addition to all tasks defined in the Project 1 document, the consumer will read all encoded frames through the shared pipe, converts all lowercase characters to uppercase and write the modified version of the received data into a file with extension *outf*.

### 3. Details
The following are the tasks to be done for this project:
  a.  Create a simple consumer/producer application, as discussed in this document, that uses a shared pipe for communication.
  b.  The *filename.inpf* will contain all the original data to be shared between producer and consumer.

c. The *filename.binf* is the binary (0's and 1's) version of the original data. It is created by the producer, shared with the consumer through the pipe, and processed by the consumer.
d. The *filename.outf* is the modified version of *filename.inpf* where all lower case letters have been replaced by upper case letters. The consumer is responsible for the creation of *filename.outf*.

## 3. What to Submit

a) Your solution must be uploaded to Blackboard.
b) Copies of the source files for both your producer and your receiver as well as their executables, and any data you used for testing your solution.
c) You are to place all files that are related to your solution to a .zip file. Your .zip file must follow the format: *CSI 500 Project2 Your Name*.
d) The documentation associated with your solution must be typeset in MS Word. Marks will be deducted if you do not follow this requirement.

Your program should be developed using GNU versions of the C compiler. It should be layered, modularized, and well commented. The following is a tentative marking scheme and what is expected to be submitted for this assignment:

1. External Documentation (as many pages necessary to fulfill the requirements listed below.) including the following:
   a. Title page
   b. A table of contents
   c. [20%] System documentation
      i. A high-level data flow diagram for the system
      ii. A list of routines and their brief descriptions
      iii. Implementation details
   d. [5%] Test documentation
      i. How you tested your program
      ii. Test sets must include
         - input files *.inpf*; binary files *.binf*; and output files *.outf*.
         - You may use the quote below as one of your testing files. You may name it as *winVirus.inpf*.
   e. [5%] User documentation
      i. How to run your program
      ii. Describe parameter (if any)

2. Source Code
   a. [65%] Correctness
   b. [5%] Programming style
      i. Layering
      ii. Readability

        iii.     Comments
        iv.     Efficiency

*Joke:*
*McAfee-Question: Is Windows a virus?*
*No, Windows is not a virus. Here's what viruses do:*
*1. They replicate quickly-okay, Windows does that.*
*2. Viruses use up valuable system resources, slowing down the system as they do so-okay, Windows does that.*
*3. Viruses will, from time to time, trash your hard disk-okay, Windows does that too.*
*4. Viruses are usually carried, unknown to the user, along with valuable programs and systems. Sign... Windows does that, too.*
*5. Viruses will occasionally make the user suspect their system is too slow (see 2.) and the user will buy new hardware. Yup, that's with Windows, too.*
*Until now it seems Windows is a virus but there are fundamental differences:*
*Viruses are well supported by their authors, are running on most systems, their program code is fast, compact and efficient and they tend to become more sophisticated as they mature.*
*So Windows is not a virus. It's a bug.*