CS105 – Computer Systems Spring 2020

Problem Session 5: File and Network IO

Wednesday, April 29, 2020

1. Consider the following code:

```
int main(int argc, char* argv[]){
    char buf[3] = "ab";
    int r = open("file.txt", O_RDONLY);
    int r1 = dup(r); // equivalent to dup2(r, r1);

    read(r, buf, 1);

    int pid;
    if((pid=fork()) == 0) {
        r1 = open("file.txt", O_RDONLY);
    } else{
        waitpid(pid, NULL, 0);
    }

    read(r1, buf+1, 1);

    printf("%s", buf);

    return 0;
}
```

Assume that the disk file `file.txt` contains the string of characters `CS105` . Also assume that all system calls succeed. What will be the output when this code is compiled and run?

2. Logging daemons are background processes whose purpose is simply to accept messages from clients and log them to a file. (This is sometimes used in secure networks to ensure that, even if an attacker breaks into a computer, he cant erase his traces from the logs because a copy of the log is stored elsewhere.)

   In the following table, please list the UNIX I/O function calls that each side of the connection would make. Each row should contain the name of a single system or library call, placed in the appropriate column. Please list the calls in the order they are called, not the order they return. Please only include network-related operations (accept, bind, close, connect, listen, read, socket, and write).

   You should make the following assumptions:

   - The server and client are communicating over TCP.
   - The server finishes initializing before the client starts.
   - The server only serves a single client.
   - The client already knows the servers IP address.
   - The client only sends one message before closing the connection.

Client	Server