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* Project: Assignment 5 – Buffered I/O
* File: WriteUp5.pdf
*
* Description: This is the write up file for the program and it includes a
* description of the project, what I did, issues I had and execution output
* from the original program.
*****/

```

**Description:** In this program we build the BufferedIO further by adding a `b_write` function using system call APIs and handles buffered IO. The `b_write` takes a file descriptor, a buffer and the number of bytes to be written. It also only writes in 512 bytes of chunks at a time by copying from the caller's buffer to my own buffer. The return value from this function is the number of bytes transferred from the caller's buffer. In the `b_write` function first we initialize the buffer and check if the file descriptor is within 0 and (MAXFCBS-1). The function accepts the data and the number of bytes provided and using the Linux System Calls, buffers the data in 512 byte chunks and writes in the same chunk size too. First we check that our buffer and count doesn't exceed the chunk size given. Then we copy these number of bytes into our buffer. Then we adjust the buffer length and its index to set the number of bytes copied. If our buffer is nearly full but not completely, then the number of bytes to copy is divided into parts and the same actions are performed sequentially. But if our buffer is completely full, then we write to file in the given chunk size i.e 512 bytes. Now, if our buffer and count exceed the chunk size given, then we directly copy the first part into our buffer and directly write to the file in 512 bytes. Then we calculate the bytes remaining after first write and the next write amount. Again we write to file directly from the caller's buffer in blocks\*512 bytes. Now again, we calculate the remaining bytes after this second write. Finally we return the number of characters actually written. The remaining parts of the code are same as in the assignment 2 because we are only adding `b_write` function to write our buffer into a separate file and that is Clean.txt.

## Compilation and Execution:

```
assignment-5-buffered-io-write-developer-soni — devsoni@Devs-MacB...
(base) → assignment-5-buffered-io-write-developer-soni git:(main) × make
gcc -c -o soni_dev_HW5_main.o soni_dev_HW5_main.c -g -I.
gcc -c -o b_io.o b_io.c -g -I.
gcc -o soni_dev_HW5_main soni_dev_HW5_main.o b_io.o -g -I.
(base) → assignment-5-buffered-io-write-developer-soni git:(main) ×

gcc -c -o soni_dev_HW5_main.o soni_dev_HW5_main.c -g -I.
gcc -c -o b_io.o b_io.c -g -I.
gcc -o soni_dev_HW5_main soni_dev_HW5_main.o b_io.o -g -I.
(base) → assignment-5-buffered-io-write-developer-soni git:(main) × make run
./soni_dev_HW5_main DecOfInd.txt Clean.txt
(base) → assignment-5-buffered-io-write-developer-soni git:(main) ×
```

The Clean.txt file is attached to the Github for the complete output. (Here is a sample included)

```
Clean.txt — Locked
The unanimous Declaration of the thirteen united States of America, When
in the Course of human events, it becomes necessary for one people to
dissolve the political bands which have connected them with another, and
to assume among the powers of the earth, the separate and equal station to
which the Laws of Nature and of Nature's God entitle them, a decent
respect to the opinions of mankind requires that they should declare the
causes which impel them to the separation.

We hold these truths to be self-evident, that all men are created equal,
that they are endowed by their Creator with certain unalienable Rights,
that among these are Life, Liberty and the pursuit of Happiness.—That to
secure these rights, Governments are instituted among Men, deriving their
just powers from the consent of the governed, —That whenever any Form of
Government becomes destructive of these ends, it is the Right of the
People to alter or to abolish it, and to institute new Government, laying
its foundation on such principles and organizing its powers in such form,
as to them shall seem most likely to effect their Safety and Happiness.
Prudence, indeed, will dictate that Governments long established should
not be changed for light and transient causes; and accordingly all
experience hath shewn, that mankind are more disposed to suffer, while
evils are sufferable, than to right themselves by abolishing the forms to
which they are accustomed. But when a long train of abuses and
usurpations, pursuing invariably the same Object evinces a design to
reduce them under absolute Despotism, it is their right, it is their duty,
to throw off such Government, and to provide new Guards for their future
security.—Such has been the patient sufferance of these Colonies; and
such is now the necessity which constrains them to alter their former
Systems of Government. The history of the present King of Great Britain is
a history of repeated injuries and usurpations, all having in direct
object the establishment of an absolute Tyranny over these States. To
prove this, let Facts be submitted to a candid world.

He has refused his Assent to Laws, the most wholesome and necessary for
the public good.
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He has plundered our seas, ravaged our Coasts, burnt our towns, and destroyed the lives of our people.

He is at this time transporting large Armies of foreign Mercenaries to compleat the works of death, desolation and tyranny, already begun with circumstances of Cruelty & perfidy scarcely paralleled in the most barbarous ages, and totally unworthy the Head of a civilized nation.

He has constrained our fellow Citizens taken Captive on the high Seas to bear Arms against their Country, to become the executioners of their friends and Brethren, or to fall themselves by their Hands.

He has excited domestic insurrections amongst us, and has endeavoured to bring on the inhabitants of our frontiers, the merciless Indian Savages, whose known rule of warfare, is an undistinguished destruction of all ages, sexes and conditions.

In every stage of these Oppressions We have Petitioned for Redress in the most humble terms: Our repeated Petitions have been answered only by repeated injury. A Prince whose character is thus marked by every act which may define a Tyrant, is unfit to be the ruler of a free people.

Nor have We been wanting in attentions to our Brittish brethren. We have warned them from time to time of attempts by their legislature to extend an unwarrantable jurisdiction over us. We have reminded them of the circumstances of our emigration and settlement here. We have appealed to their native justice and magnanimity, and we have conjured them by the ties of our common kindred to disavow these usurpations, which, would inevitably interrupt our connections and correspondence. They too have been deaf to the voice of justice and of consanguinity. We must, therefore, acquiesce in the necessity, which denounces our Separation, and hold them, as we hold the rest of mankind, Enemies in War, in Peace Friends.

We, therefore, the Representatives of the united States of America, in General Congress, Assembled, appealing to the Supreme Judge of the world for the rectitude of our intentions, do, in the Name, and by Authority of the good People of these Colonies, solemnly publish and declare, That these United Colonies are, and of Right ought to be Free and Independent States; that they are Absolved from all Allegiance to the British Crown, and that all political connection between them and the State of Gr