

Assignment 5 – Buffered I/O

Description

This program functions as a buffered reader for input and output data. Its operation involves setting up an array for file control blocks and populating it with files. Then, the software loads and reads the file into the buffer of the file control block. It then transfers the data from the fcb buffer into the buffer of the user who called the software. And after everything is completed it closes its resources.

Approach/What I did

I started off this project a bit in the wrong order, I started coding before I did enough planning and that hurt me in the long run since I had to restart about halfway through my work since nothing was going right. After I did some research, however, I found the coding portion much easier and chugged through the rest of the project. I had some small hiccups where I wasn't accounting for the end of file correctly among other things but I managed to solve those in the end.

Problems and Solutions

I had issues initially keeping track of the buffer position and file position while reading, I forgot the file position entirely. So I had to maintain two separate variables within the `b_fcb` structure to store the buffer position and the file position and update these variables after each read operation to ensure proper functioning of the `b_read()` function.

I tried to ensure that I was handling multiple files being open at the same time correctly. I realized I was incorrectly using the `fcbArray` and had to ensure that each open file had its own `b_fcb` entry in the `fcbArray`.

It was hard to parse the output in the project because the files were being read simultaneously, but after a bit of concerted effort, I believe I was able to parse what was happening and used that to help debug.

Compilation

```
student@student-VirtualBox:~/Desktop/Spring23Assignments/csc415-assignment-5-bufferedio-nlrennacker$ make
gcc -c -o b_io.o b_io.c -g -I.
gcc -o Rennacker_Nathan_HW5_main b_io.o buffer-main.o -g -I.
student@student-VirtualBox:~/Desktop/Spring23Assignments/csc415-assignment-5-bufferedio-nlrennacker$ █
```

Execution

```
student@student-VirtualBox:~/Desktop/Spring23Assignments/csc415-assignment-5-bufferedto-nlrennacker$ make run
```

```
gcc -c -o b.io.o b.io.c -g -I.
gcc -o Rennacker_Nathan_HWS_main b.io.o buffer-main.o -g -I.
./Rennacker_Nathan_HWS_main DATA DecOfInd.txt CommonSense.txt
The unanimous Declaration of the thirteen united States of America, When in the Cours
Perhaps the sentiments contained in the following pages, are not yet
suf
e of human events, it becomes necessary for one people to d
ficiently fashionable to procure them general favor;
issolve the political bands which have conne
a long habit
of not thinking a thing wron
cted them with another, and to assume among the powers of the earth, the separate
g, gives it a superficial appearance of
being right, and raises at first a
and equal station to which the Laws of Nature and of Nat
formidable outcry in defense of
custom. But the tumult soon subsides. Time mak
ure's God entitle them, a decent respect
es more converts than
reason.
```

```
As a long an
to the opinions of mankind requires that they should declar
d violent abuse of power, is generally the Me
e 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 Happi
ans of calling
the right of it in question (and in Matters too which might never have
ness. Prudence, indeed, will dictate that Government
e
been thought of, had not the Sufferers been aggravated into the inquiry)
and as the King of England hath undertaken in his own Right, to support
the Parliament in what he calls Theirs, and as the good people of this
country are grievously oppressed by the combination, they have an undoubted
privilege to inquire into the pretensions of both, and equally to reject the
usurpation of either.
```

```
In the following sheets, the author hath studiously avoided every thing
which is personal among ourselves. Compliments as well as censure to
individuals make no part thereof. The wise, and the worthy, need not the
triumph of a pamphlet; and those whose sentiments a
s long established should not be changed for lig
re injudicious, or
unfriendly, will cease of themselves unless too mu
ht and transient causes; and accordingly all exper
ch pains are bestowed
upon their conversion.
```

```
Th
ience hath shewn, that mankind are more disposed to su
e cause of America is in a great measure the cause of all manki
ffer, while evils are sufferable, than to
nd. Many
circumstances hath, and will arise, which are not local, but universal
right themselves by abolishing the forms to which they are accustomed. But when a long tra
, and
through which the principles of all Lovers of
in of abuses and usurpations, pursuing invariably the same O
Mankind are affected, and in
the Event of whic
bjeet evinces a design to reduce them under absolute Despotism, it is
h, their as censure to
individuals make no part ther
their right, it is their duty, to throw off such Government, and to provide new
eof. The wise, and the worthy, need not the
triumph of a pamphlet; and those whose senti
Guards for their future security.--Such h
ments are injudicious, or
unfriendly, will cease of themsel
as been the patient sufferance of these
ves unless too much pains are bestowed
upon their conversion.
```

```
The cause of Ameri
Colonies; and such is now the necessity whic
ca is in a great measure the cause of all mankind. Many
circumst
h constrains them to alter their former Syste
ms of Government. The history of the present King of Great Britain is a history of rep
eated injuries and usurpations, all having in direct object the establishme
nt of an absolute Tyranny over these States. To prove this, let Facts be submitted t
o a candid world.
```

```
He has refused his Assent to
Laws, the most wholesome and necessary f
or the public good.
```

```
He has forbidden his Governors to pass Laws of immedia
te and pressing importance, unless suspended in their operation till his Assent sh
ould be obtained; and when so suspended, he has utterly neglected to
attend to them.
```

```
He has refused to pass other Laws for the accommodation of large district
s of people, unless those people would relinquish the right of R
epresentation in the Legislature, a right inestimable to them and formidable
to tyrants only.
```

```
He has called together
legislative bodies at places unusual, uncomforta
```

ble, and distant from the depository of the
ir public Records, for the sole purpose of fatiguing them
into compliance with his measures.

He has dissolved Representative Houses repeate
dly, for opposing with manly firmness his invasions on the rights of the
people.

He has refused for a long time, afte
r such dissolutions, to cause others to be elected; whereby the Legislative powers, in
capable of Annihilation, have returned t
o the People at large for their exercise; the
State remaining in the mean time exposed to all t
he dangers of invasion from without, and convulsions within.

He has endeavoured to pre
vent the population of these States; for that purpose obstructing the Laws fo
r Naturalization of Foreigners; refusing to pass o
thers to encourage their migrations hither, and raising the cond
itions of new Appropriations of Lands.

He has obstructed the Administration of Justice, b
y refusing his Assent to Laws for establishing Judiciary powers.

He has
made Judges dependent on his Will alone,
for the tenure of their offices, and the amount and payment of their salaries.

He h
as erected a multitude of New Offices, and sent hither swarms of Officers to harrass
our people, and eat out their substance.

He
has kept among us, in times of peace, Standing Armi
es without the Consent of our legislatur
es.

He has affected to render the Military independent of and superior to the Civil power
.

He has combined with others to subject
us to a jurisdiction foreign to our constitution, and unacknowledged by ou
r laws; giving his Assent to their Acts o
f pretended Legislation:

For Quartering large bodies of armed
troops among us:

For protecting them, by a mock Trial, from puni
shment for any Murders which they should commit on the Inhabita

nts of these States:

For cutting off our Trade with all parts of the world:

For imposing Taxes on us without our Consent:

For depriving us in many cases, of the benefits of Trial by Jury:

For transporting us beyond Seas to be tried for pretended offences

For abolishing the free System of English Laws in a neighbouring Province, establishing therein an Arbitrary government, and enlarging its Boundaries so as to render it at once an example and fit instrument for introducing the same absolute rule into these Colonies:

For taking away our Charters, abolishing our most valuable Laws, and altering fundamentally the Forms of our Governments:

For suspending our own Legislatures, and declaring themselves invested with power to legislate for us in all cases whatsoever.

He has abdicated Government here, by declaring us out of his Protection and waging War against us.

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 complete 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 P
etitions have been answered only by repe
ated injury. A Prince whose character is thus marked by ev
ery act which may define a Tyrant, is unfit to be the rule
r 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 unwa
rrantable jurisdiction over us. We have remin
ded them of the circumstances of our emigration
and settlement here. We have appealed to their native justice and magnanim
ity, and we have conjured them by the ties of our common kin
dred to disavow these usurpations, which, would inevitably interrupt our connections and
correspondence. They too have been deaf to the voice of justice and of consanguin
ity. We must, therefore, acquiesce in the necessity, which den
ounces our Separation, and hold them, as we hold the rest of mankind, Enemies in
War, in Peace Friends.

We, therefore, the Representatives of the u
nited States of America, in General Congress,
Assembled, appealing to the Supreme Judge of the world for the rectitude of our i
ntentions, do, in the Name, and by Authority of the good Peopl
e 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 Gre Friends.

We, therefore, the Representatives of the united States of Ameri
ca, in General Congress, Assembled, appe
aling to the Supreme Judge of the world for the rectitude of o
ur intentions, do, in the Name, and by Authority of the good P
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ll Allegiance to the British C

We have read 8120 characters from file DecOfInd.txt

We have read 1877 characters from file CommonSense.txt

student@student-VirtualBox:~/Desktop/Spring23Assignments/csc415-assignment-5-bufferedio-nlrennacker\$ █