Michelle Emamdie
COP 4600
Section: 0647
Due Date: 11/17/2015
Term Project Part #4

Affirmation: This work is my own and I have not broken or bent the Honor Code.

Michelle Emamdie

Learning Experience: I learned a lot from this assignment. I thought that Part 3 prepared me for the most part. I came into this assignment with a knowledge of the kernel and how to accomplish what I wanted to within the kernel.

Easy parts: I think that the easier part of this assignment was coding the algorithm to perform the substitution in pass 1. Dave's algorithm was particularly useful in completing this portion. I also found the Transposition to be moderately easy compared to some of the other sections of the assignment.

Difficult parts: I struggled in this assignment a lot with compiling in the kernel. When I would run make, the console would run for a while then there would be an error when calling Dave's hello method. After hours of banging my head against a wall, I realized this error was occurring because every time I ran config GENERIC, the two lines that I added to the syscalls.master file were being overwritten. By simply following Dave's instructions to the tee, I was able to get rid of this issue.

Educational Objectives: I think the goal of this assignment was to get to where we can implement a syscall. We now know exactly how to code and interact with user space and kernel space because a knowledge of both and their intersection was required in order to successfully complete this assignment.

Quality: This is high quality code that has been thoroughly tested and meets all of the assignment specifications.

Suggestions: I do not have any suggestions for this assignment. I think it was a reasonable assignment to be completed in the provided amount of time. The assignment was also straightforward and reading Dave's instructions with particular caution was crucial to succeeding in the assignment.

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Additional Questions:

1. Does the program compile without errors? Yes
2. Does the program compile without warnings? Yes
3. Does the program run without crashing? Yes
4. Describe how you tested the program.
    a. I tested the program with various test cases. On the next page more of my test cases can be found with the output yielded however to keep the final output in my part4test.c I only included 3 basic test cases.
5. Describe the ways in which the program does not meet assignment's specifications.
    a. The program meets all of the assignment's specifications.
6. Describe all known and suspected bugs.
    a. There are no known bugs in the code. The code has been thoroughly tested.
7. Does the program run correctly? Yes

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Test Code

```
 char combined[1030] =
"0123456789:;<=>?@ABCDEFGHIJKLMNOPQRS
TUVWXYZ[/]^_`abcdefghijklmnopqrstuvwxyz01
23456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUV
WXYZ[/]^_`abcdefghijklmnopqrstuvwxyz012345
6789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXY
Z[/]^_`abcdefghijklmnopqrstuvwxyz012345678
9:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[/]
^_`abcdefghijklmnopqrstuvwxyz0123456789:;<
=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[/]^_`a
bcdefghijklmnopqrstuvwxyz0123456789:;<=>?
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[/]^_`abcd
efghijklmnopqrstuvwxyz0123456789:;<=>?@AB
CDEFGHIJKLMNOPQRSTUVWXYZ[/]^_`abcdefghi
jklmnopqrstuvwxyz0123456789:;<=>?@ABCDEF
GHIJKLMNOPQRSTUVWXYZ[/]^_`abcdefghijklm
nopqrstuvwxyz0123456789:;<=>?@ABCDEFGHI
JKLMNOPQRSTUVWXYZ[/]^_`abcdefghijklmnop
qrstuvwxyz0123456789:;<=>?@ABCDEFGHIJKL
MNOPQRSTUVWXYZ[/]^_`abcdefghijklmnopqrst
uvwxyz0123456789:;<=>?@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[/]^_`abcdefghijklmnopqrstuvwx
yz0123456789:;<=>?@ABCDEFGHIJKLMNOPQR
STUVWXYZ[/]^_`abcdefghijklmnopqrstuvwxyz0
123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTU
VWXYZ[/]^_`abcdefghijklmnopqrstuvwxyz01234
56789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWX
YZ[/]^_`abcdef";

   printf("\nRunning the cipher on a super long combined string larger than 1025.\n\nThe initial string is: %s\n", combined);

   cipher(combined, 1, 2);

   printf("\n\n\nThe output is: %s\nThe length of the long combined string is %d\n", combined, strlen(combined));
```

Output

The output is:

```
45238967:;01>?<=cD@BgHeFkLiJoPmNsTqRwX
uVa[yZ^_/]Cd`bGhEfKlIjOpMnStQrWxUvA2Yz56
349078;<1:?@=>DeBcHiFgLmJkPqNoTuRsXyVw[
/Za_`]^dEbChIfGlMjKpQnOtUrSxYvW23zA67450
189<=:;@B>?eFcDiJgHmNkLqRoPuVsTyZwX/]a[`
b^_EfCdIjGhMnKlQrOpUvStYzWx34A278561:90
=>;<Bc?@FgDeJkHiNoLmRsPqVwTuZaXy]^[/bC_
`fGdEjKhInOlMrSpQvWtUzAxY45238967:;01>?<
=cD@BgHeFkLiJoPmNsTqRwXuVa[yZ^_/]Cd`bG
hEfKlIjOpMnStQrWxUvA2Yz56349078;<1:?@=>
DeBcHiFgLmJkPqNoTuRsXyVw[/Za_`]^dEbChIfGl
MjKpQnOtUrSxYvW23zA67450189<=:;@B>?eFc
DiJgHmNkLqRoPuVsTyZwX/]a[`b^_EfCdIjGhMnK
lQrOpUvStYzWx34A278561:90=>;<Bc?@FgDeJk
HiNoLmRsPqVwTuZaXy]^[/bC_`fGdEjKhInOlMrS
pQvWtUzAxY45238967:;01>?<=cD@BgHeFkLiJo
PmNsTqRwXuVa[yZ^_/]Cd`bGhEfKlIjOpMnStQr
WxUvA2Yz56349078;<1:?@=>DeBcHiFgLmJkPq
NoTuRsXyVw[/Za_`]^dEbChIfGlMjKpQnOtUrSxY
vW23zA67450189<=:;@B>?eFcDiJgHmNkLqRoP
uVsTyZwX/]a[`b^_EfCdIjGhMnKlQrOpUvStYzWx
34A278561:90=>;<Bc?@FgDeJkHiNoLmRsPqVw
TuZaXy]^[/bC_`fGdEjKhInOlMrSpQvWtUzAxY45
238967:;01>?<=cD@BgHeFkLiJoPmNsTqRwXuV
a[yZ^_/]Cd`bGhEfKlIjOpMnStQrWxUvA2Yz5634
9078;<1:?@=>DeBcHiFgLmJkPqNoTuRsXyVw[/Z
a_`]^a
```

The length of the long combined string is 1025

Test code

```
   char lower[26] =
"abcdefghijklmnopqrstuvwxyz";

  printf("\nRunning the cipher on the alphabet
in lowercase\n\nThe initial string is: %s\n",
lower);

   cipher(lower, 2, 3);

   printf("\nThe output is: %s\n", lower);
```

Output

```
The output is: EfCdIjGhMnKlQrOpUvStYzWxbA
```

Test code

```
      char upper[26] =
"ABCDEFGHIJKLMNOPQRSTUVWXYZ";

   printf("\nRunning the cipher on the alphabet
in uppercase\n\nThe initial string is: %s\n",
upper);

   cipher(upper, 5, 2);

   printf("\nThe output is: %s\n", upper);
```

Output

```
The output is: HiFgLmJkPqNoTuRsXyVwBcZaeD
```

Test code

```
       char numbers[10] = "0123456789";

   printf("\nRunning the cipher on some
numbers\n\nThe initial string is: %s\n",
numbers);

   cipher(numbers, 2, 2);

   printf("\nThe output is: %s\n", numbers);
```

Output

```
The output is:
45238967gh01klefopijstmnwxqrabuvdcyz
```

Test code

```
   char all[15] = "abcdEFGHij09KL1";

   printf("\nRunning the cipher on a
combination of letters (capital or lowercase)
and numbers\n\nThe initial string is: %s\n", all);

   cipher(all, 7, 2);

   printf("\nThe output is: %s\n", all);
```

Output

```
The output is: jKhINoLm21pQ36R
```