Assignment#2

Exec System Calls

Course: Operating System

Instructor: Saad Ahmad

Due Date: 25th October 2024

Time: 5:00 PM

Objective

The purpose of this assignment is to gain hands-on experience with various `exec` system calls and learn how to document code using LaTeX.

Task 1: Introduction to LaTeX

LaTeXis a powerful typesetting system widely used for producing scientific and technical documents. It allows users to write code, documents, and reports with high precision, making it a preferred tool for researchers and professionals in many fields. Unlike traditional word processors, LaTeXseparates content from formatting, ensuring professional and clean output.

For this assignment, you will be using LaTeX to document your code for various `exec` system calls. If you are new to LaTeX, I recommend using Overleaf, an online platform for creating, editing, and sharing LaTeXdocuments.

Fun Fact

Did you know LaTeX has been around since the 1980s and is still used widely today?

Joke

Why do LaTeX documents look so professional? Because they're well-"typeset"!

Task 2: `exec` System Calls

In this task, you are required to write C code for each of the following `exec` system calls:

- `execl`
- `execlp`
- `execle`
- `execv`
- `execve`
- `execvp`

For each system call, you are required to:

1. Write the C code that demonstrates the use of each `exec` call.
2. Document the code, explaining what each call does and its purpose.
3. Provide a practical scenario where you might use each of these system calls.

Fun Fact

The `exec` system calls replace the current process image with a new one, making it one of the most powerful features in UNIX-like systems.

Joke

Why was the shell so calm during execution? Because it knew how to handle the "exec"!

Task 3: Submission Instructions

Your final submission must include:

1. The C code files for each `exec` system call.
2. A LaTeXdocument that includes:
    - The purpose and usage of each `exec` system call.
    - A brief explanation of the code you have written.
    - Screenshots or terminal output embedded in the LaTeXdocument to demonstrate execution.

Your LaTeXreport must follow these guidelines:

- Use sectioning commands like `\section` and `\subsection` to organize the document.
- Include code snippets using the `listings` package, as shown below.

```c
#include <stdio.h>
#include <unistd.h>

int main() {
    execl("/bin/ls", "ls", NULL);
    return 0;
}
```

Listing 1: Sample Code

Resources

For help with LaTeX, check out these resources:

- Overleaf Learn: A great place for LaTeXtutorials and documentation.
- Wikibooks LaTeX Guide: A detailed guide on how to use LaTeX.

Bonus Task (Optional)

Try creating a mini-shell in C that uses one of the `exec` system calls to execute commands entered by the user.

Bonus Joke

Why don't programmers like nature? It has too many bugs!

Good luck!