Assignment 7 – XXD

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Purpose

The XD program is designed to provide a human-readable representation of binary files by displaying their hexadecimal and ASCII representations. This tool aids in understanding the content of binary files, making it easier for users to interpret and analyze the data within.

How to Use the Program

```
make all
```

Followed by:

```
./xd *more will be needed*
```

A file will be necessary directly after the ./xd.
Ex:

```
./xd sample_file.bin
```

Alternatively it will read from stdin.

Program Design

Data Structures

The program utilizes basic data structures such as arrays and file descriptors. The choice of these structures is based on simplicity and efficiency for the given task.

Algorithms

The main algorithm involves reading the binary file in chunks of 16 bytes and printing the hexadecimal and ASCII representations. Pseudocode for this algorithm is as follows:

```
read_and_display_hex_ascii(file):
    open the file
    while not end of file:
        read 16 bytes into a buffer
        print_hex_ascii_line(buffer)
    close the file

print_hex_ascii_line(buffer, size):
    print hexadecimal representation of buffer
    print ASCII representation of buffer
```

Function Descriptions

1. print_hex_ascii_file(filename):
    - Inputs: `filename` - the name of the binary file.
    - Outputs: None
    - Purpose: Opens the file, reads it in chunks, and prints the hexadecimal and ASCII representations.
2. print_hex_ascii_line(buffer, size):
    - Inputs: `buffer` - an array containing binary data, `size` - the size of the data in the buffer.
    - Outputs: None
    - Purpose: Prints the hexadecimal and ASCII representations of the data in the buffer.

Results

The XD program successfully achieves its purpose by providing a clear and readable output of the hexadecimal and ASCII representations of the binary file. The basic implementation meets the assignment requirements, but further enhancements could shorten the length of the file to under 1000 bytes for extra credit. I did not successfully attempt this extra credit.