

# Read and Write File

In VHDL, you can read and write files using the `textio` package. The `textio` package provides procedures and functions for reading and writing text files. You can use the `textio` package to read data from a file into a variable or write data from a variable to a file.

## Reading from a File

We can use the TextIO library to handle file operations in VHDL. This feature is useful for reading input from files during simulation. Here's how to read inputs from a file:

```
library ieee;
use ieee.std_logic_1164.all;
use std.textio.all;

entity read_file is
end read_file;

architecture rtl of read_file is
    file input_file : text open read_mode is "input.txt";
    variable line : line;
    variable data : integer;
begin
    while not endfile(input_file) loop
        readline(input_file, line);
        read(line, data);
        report "Read data: " & integer'image(data);
    end loop;
    file_close(input_file);
    wait;
end rtl;
```

Code above shows an example of reading data from a file in VHDL. The file `input.txt` is opened in read mode, and data is read line by line using the `readline` procedure. The data is then converted to an integer using the `read` function and displayed using the `report` statement.

# Writing to a File

We can also write testbench results to a file for further analysis. Use the TextIO library's `write` and `writeline` functions to save data to a file:

```
library ieee;
use ieee.std_logic_1164.all;
use std.textio.all;

entity write_file is
end write_file;

architecture rtl of write_file is
    file output_file : text open write_mode is "output.txt";
    variable data : integer := 42;
begin
    write(output_file, data);
    writeline(output_file, "Data written to file: " & integer'image(data));
    file_close(output_file);
    wait;
end rtl;
```

For more information on the `textio` package, refer to the IEEE Standard VHDL Language Reference Manual.

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