

# Standard Packages

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# Data Types in the Standard Packages

- bit '0' , '1'
- bit\_vector An array with each element of type bit
- character 'c'
- string An array with each element of type character
- boolean FALSE, TRUE
- integer At least  $-(2^{31} - 1) \sim +(2^{31} - 1)$
- natural 0, 1, 2, ...
- positive 1, 2, 3, ...
- real  $-1.0 \times 10^{38} \sim +1.0 \times 10^{38}$

library std, work;  
use std.standard.all;

# VHDL Standard Packages

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```
library IEEE;  
    use IEEE.std_logic_1164.all;  
    use IEEE.std_logic_textio.all;  
    use IEEE.std_logic_arith.all;  
    use IEEE.numeric_bit.all;  
    use IEEE.numeric_std.all;  
    use IEEE.std_logic_signed.all;  
    use IEEE.std_logic_unsigned.all;  
    use IEEE.math_real.all;  
    use IEEE.math_complex.all;  
  
library STD;  
use STD.textio;
```

## References

- [1] <http://en.wikipedia.org/>
- [2] J. V. Spiegel, VHDL Tutorial,  
[http://www.seas.upenn.edu/~ese171/vhdl/vhdl\\_primer.html](http://www.seas.upenn.edu/~ese171/vhdl/vhdl_primer.html)
- [3] J. R. Armstrong, F. G. Gray, Structured Logic Design with VHDL
- [4] Z. Navabi, VHDL Analysis and Modeling of Digital Systems
- [5] D. Smith, HDL Chip Design
- [6] <http://www.csee.umbc.edu/portal/help/VHDL/stdpkg.html>
- [7] VHDL Tutorial - VHDL online [www.vhdl-online.de/tutorial/](http://www.vhdl-online.de/tutorial/)