

UE VLSI-2 TP: Tcl scripting language

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Tcl (Tool Command Language) is a scripting language created by John Ousterhout. Most of EDA tools integrate a Tcl interpreter. When using an EDA tool, you should clearly understand what is the pure Tcl part and what are the specific commands of the tool. This first section will give you an overview of Tcl. **In the following you will use “Vi” as text editor (only the variants are allowed: “Vim”, “Gvim” etc.).**

1. Hello world

In a file (with “.tcl” extension) enter:

```
# this is a comment
set name "your_name"
puts "Hello $name!"
```

Then run this script, in the command line enter:

```
tclsh <your-file>
```

2. For loop

```
for { set i 0 } { $i < 10 } { incr i } {
    puts " i => $i"
}
```

3. List

```
# first create a list
set coders [list "jack" "steve" "william" "franck" "edward"]

foreach coder $coders {
    puts $coder
}

set third_coder [lindex $coders 2]
puts "the third coder is : $third_coder"
```

4. Array

```

set days(d1) Monday
set days(d2) Tuesday
set days(d3) Wednesday
set days(d4) Thursday
set days(d5) Friday
set days(d6) Saturday
set days(d7) Sunday

puts [array size days]

foreach k [array names days] {
    puts "key: $k   val: $days($k) "
}

```

5. Practice: write a Tcl script

Store the following table in your script, and then print the cell name, the type of each cell, the inputs, the number of inputs and the outputs.

CELL	TYPE	INPUTS	OUTPUTS	BC Timing (ps)	WC Timing (ps)
<i>and2</i>	AND	I0 I1	O	102	198
<i>andn3</i>	AND	I0 I1 NI2	O	251	430
<i>nand4</i>	NAND	I0 I1 I1	Z	123	199
<i>or2</i>	OR	i0 i1	o	102	203
<i>or3</i>	OR	i0 i1 i2	o	126	233
<i>xor2</i>	XOR	i0 i1	x	213	359
<i>xor3</i>	XOR	i0 i1	x	245	402
<i>bcell4</i>	BCELL	a0 a1 b0 b1	O0 O1	412	765
<i>bcell5</i>	BCELL	a0 a1 b0 b1 b2	O0 O1	498	876

A path can be represented by a list of cells. Make a function that takes a path as input and compute the timing for the entire path using the WC timings. And another function using the BC timings.