

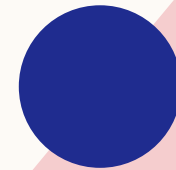
CLOCKS GENERATION

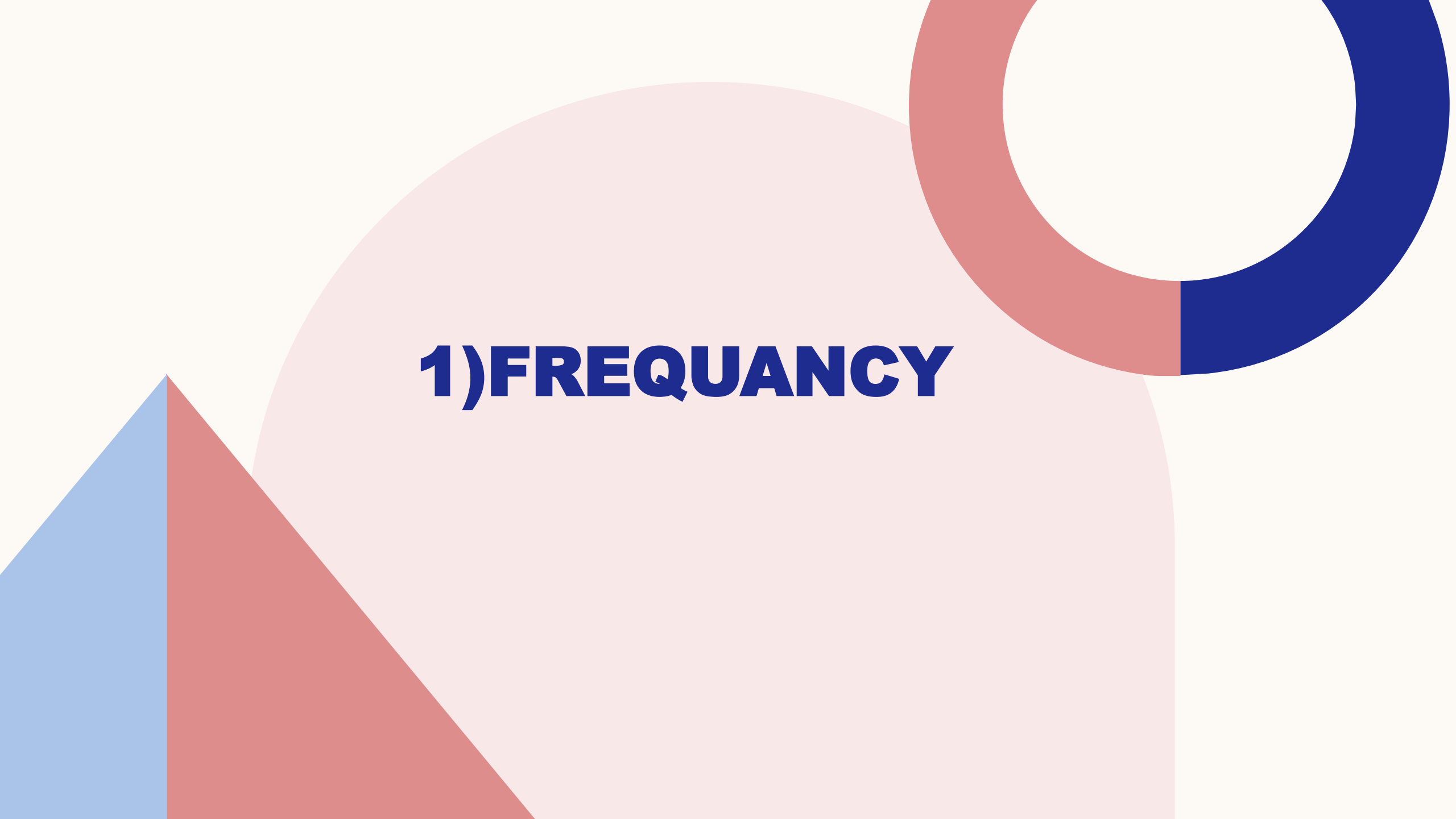
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INTRODUCTION

The key properties of a digital clock are:

- ☐ frequency
- ☐ duty cycle
- ☐ clock phase.





1) FREQUENCY

frequency:

it is a measure of the number of occurrences of a repeating event per unit of time. which represents the number of cycles per second. By change frequency the period will be change and the clock on and off will change also.

```
clock_generator u0(enable,clock1);  
clock_generator #(.FREQUENCY(200000)) u1(enable,clock2);  
clock_generator #(.FREQUENCY(400000)) u2(enable,clock3);
```

Here I change frequency from 100000khz to 200000khz
And finally to 400000khz.

frequency:

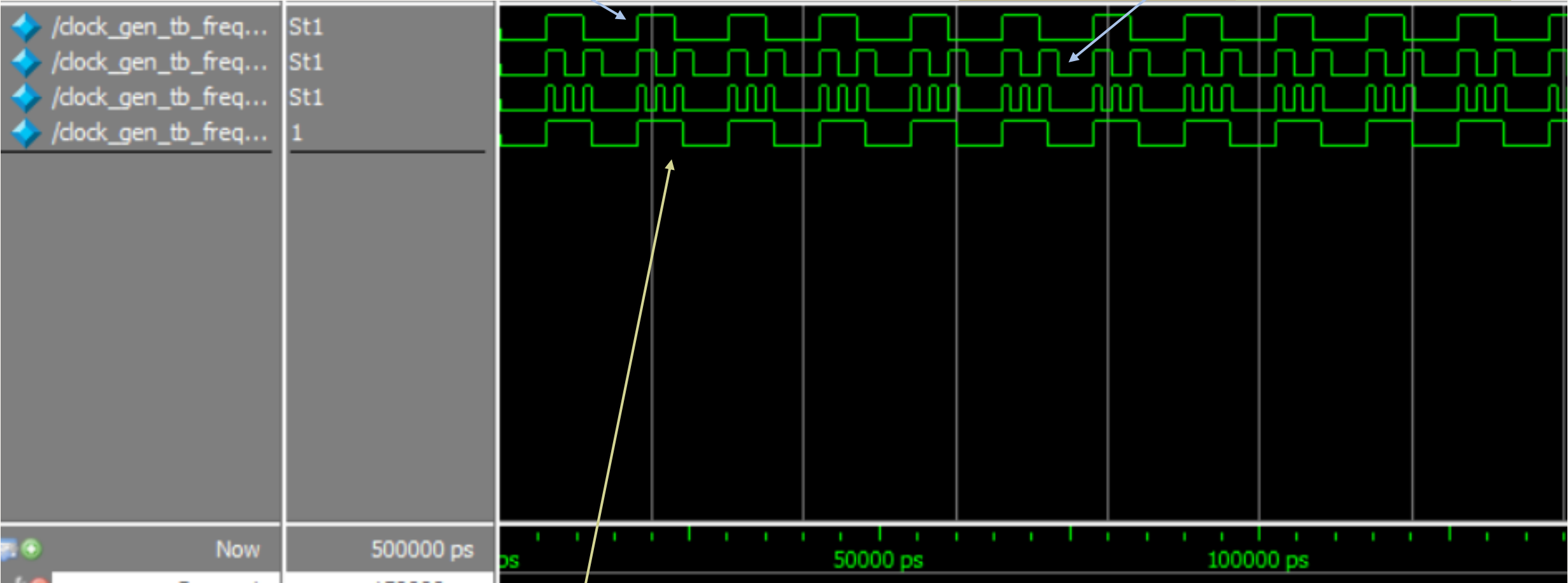
The result of simulation

```
VSIM 309> run 500000ps
# the clock frequency = 100000KHZ , duty= 50 ns, phase= 0 degree:
# the clock period is =10.00 ns
# the time of clock high is =5.00 ns
# the time of clock low is =5.00 ns
#
# the clock frequency = 200000KHZ , duty= 50 ns, phase= 0 degree:
# the clock period is =5.00 ns
# the time of clock high is =2.50 ns
# the time of clock low is =2.50 ns
#
# the clock frequency = 400000KHZ , duty= 50 ns, phase= 0 degree:
# the clock period is =2.50 ns
# the time of clock high is =1.25 ns
# the time of clock low is =1.25 ns
#
```

frequency:

Clock1 when frq=100000khz

Clock2 when frq=200000khz



enable



2) DUTY CYCLE

duty cycle:

Duty cycle refers to the ratio of the duration of the active or "on" state of a signal to the total period of the signal. It is often expressed as a percentage or a fraction.

```
clock_generator #(.DUTY(25)) u0(enable,clock2);  
clock_generator u1(enable,clock1);  
  
clock_generator #(.DUTY(75)) u2(enable,clock3);
```

Here I change duty from 25ns to 50ns

And finally to 75 ns.

duty cycle:

The result of simulation

```
VSIM 316> run 50000ps
```

```
# the clock frequency = 100000KHZ , duty= 25 ns, phase= 0 degree:
```

```
# the clock period is =10.00 ns
```

```
# the time of clock high is =2.50 ns
```

```
# the time of clock low is =7.50 ns
```

```
#
```

```
# the clock frequency = 100000KHZ , duty= 50 ns, phase= 0 degree:
```

```
# the clock period is =10.00 ns
```

```
# the time of clock high is =5.00 ns
```

```
# the time of clock low is =5.00 ns
```

```
#
```

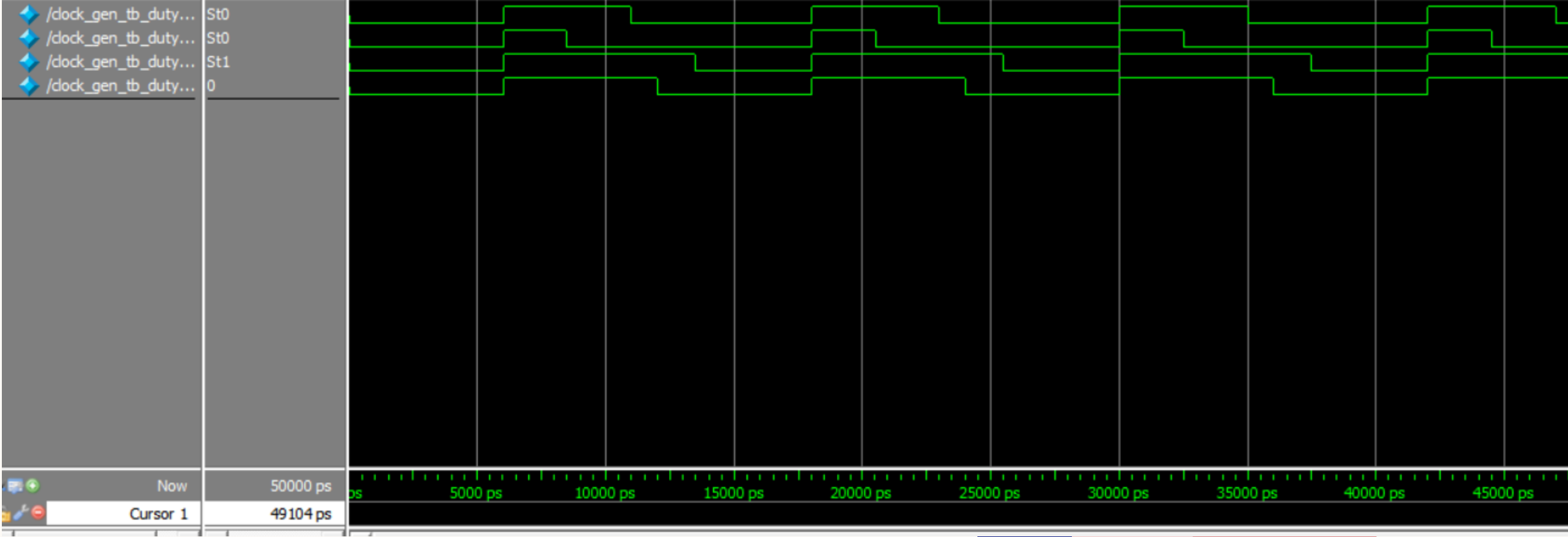
```
# the clock frequency = 100000KHZ , duty= 75 ns, phase= 0 degree:
```

```
# the clock period is =10.00 ns
```

```
# the time of clock high is =7.50 ns
```

```
# the time of clock low is =2.50 ns
```

```
#
```



Now
Cursor 1

50000 ps
49104 ps

ps 5000 ps 10000 ps 15000 ps 20000 ps 25000 ps 30000 ps 35000 ps 40000 ps 45000 ps

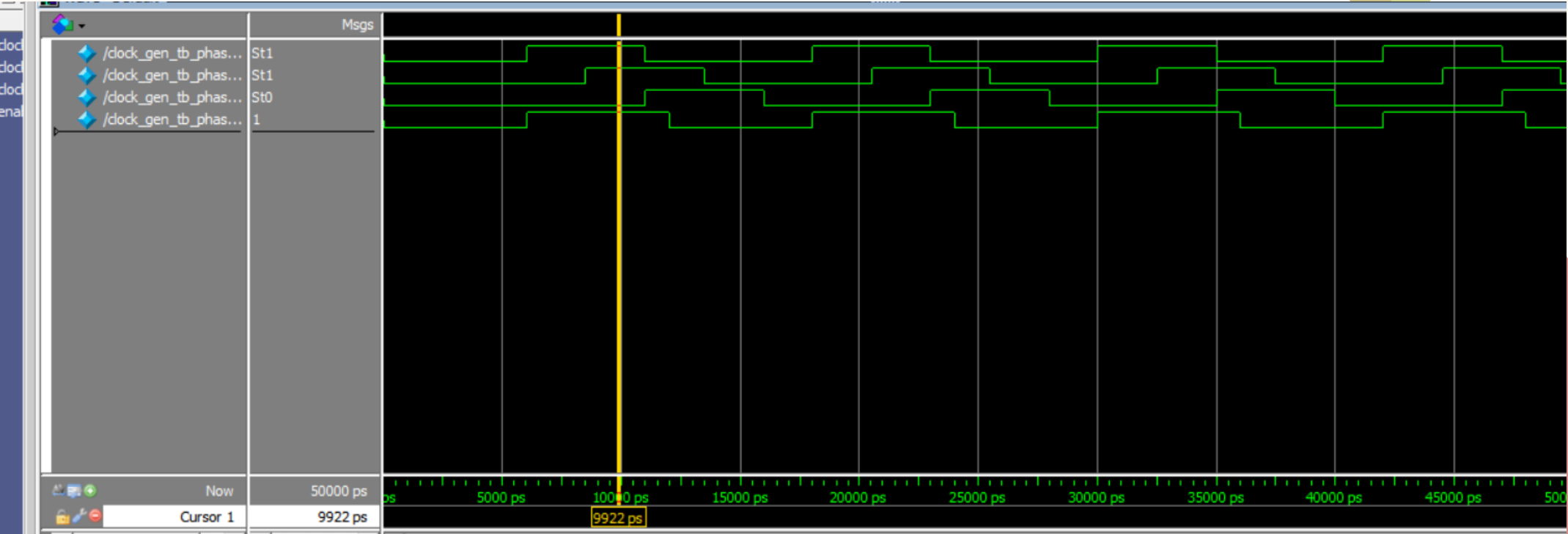


3)PHASE

phase:

Indicate the phase of the clock which change the beginner of clock

```
clock_generator u0(enable,clock1);
clock_generator #(.PHASE(90)) u1(enable,clock2);
clock_generator #(.PHASE(180)) u2(enable,clock3);
```



duty cycle:

The result of simulation

VSIM 322> run 50000ps

```
# the clock frequency = 100000KHZ , duty= 50 ns, phase= 0 degree:
# the clock period is =10.00 ns
# the time of clock high is =5.00 ns
# the time of clock low is =5.00 ns
#
# the clock frequency = 100000KHZ , duty= 50 ns, phase= 90 degree:
# the clock period is =10.00 ns
# the time of clock high is =5.00 ns
# the time of clock low is =5.00 ns
#
# the clock frequency = 100000KHZ , duty= 50 ns, phase= 180 degree:
# the clock period is =10.00 ns
# the time of clock high is =5.00 ns
# the time of clock low is =5.00 ns
#
```



THANK YOU

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