



CSE 313s

Selected Topics in Computer Engineering

Sheet 5

1. @(posedge clk) returns:

- a. 0
- b. 1
- c. Will not return any value
- d. All of the above

2. What is the difference between a `struct` and `union` in SystemVerilog?

- ↗ Explain what the following code does, and then:

- I. Write SV code to remove entries from q that have “to_remove = 1”.
- II. Write SV code to check that no entry in q has “to_remove = 1”.

```

class widget; → defines a class named widget.
    int id;
    bit to_remove; → class has two members id, to_remove .
endclass

module top;
    widget q[$]; → declares a queue of class widget objects type.
    initial begin
        widget w; → declares an object of type widget.
        int num = $urandom_range(20,40); → generates a random int. between (20-40)
        for(int i; i<num; i++) begin
            w = new;
            w.id = i;
            w.to_remove = $urandom_range(0,1);
            q.push_back(w);
            $display("widget id: %2d, to_remove: %b", q[$].id, q[$].to_remove);
        end
    end
endmodule

```

4. Write a code for clock generator?

```

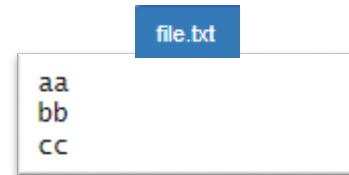
reg clk;
initial clk = 0;
always #5 clk = !clk;

```

5. What is the default value of enumerated data type?

First element is 0 , then its incremented by 1 .

6. In what context do you use foreach loop? *Accessing array elements*
7. Write a SV code to print the contents of a two dimensional array using foreach loop.
 $\text{foreach } (\text{arr}[i][j]) \quad \$\text{display } (\text{arr}[i][j]);$
8. What is the output of the following SV code given that the contents of the file "file.txt" are as follows?



```
module iques();
  string strin[$];
  int file;
  initial begin
    string s;
    file = $fopen("file.txt", "r");
    while (!$feof(file)) begin
      $fscanf(file, "%s", s);
      strin.push_front(s);
    end
    $fclose(file);
    foreach(strin[j])
      $display("index j = %0d string = %s", j,strin[j]);
    $finish;
  end
endmodule
```

index j = 0 string = cc
 index j = 1 string = bb
 index j = 2 string = aa

9. What will be the printed value out of the following code?

```
module test();
  bit [7:0] A,B;
  initial begin
    A=8'hff;B=8'h01;
    $display("%x",A+B);
  end
endmodule
```

Zero, due to overflow

10. Is this a correct code?

```
module test();
  enum {a=0, b=7, c, d=8} alphabet;
endmodule
```

No, b=7 hence, c=8 (by default) so d can't be assigned to 8.

11. In an array, if index is out of the address bounds, then what will be the return value?

Default value of the array data type.

12. What is the return type of Array locator method find_index?

queue of ints

13. Write a program to choose elements randomly from a queue. No element should be repeated until all elements are chosen. Queue may have elements repeated.

14. Declare a queue of integers with maximum number of elements to be 256 `int q[$: 255]`
15. Write a clock generator without using an always block.
- ```
reg clk;
initial begin
 clk = 0;
forever #5 clk = !clk;
end
```
16. How to pick an element from a random location in a queue.
17. What is streaming operator, and what is its use?
18. What are void functions?      *functions that does not return any value after being called by ref: modifies the original var.*
19. Explain about pass by ref and pass by value?
- by value: makes a copy of ref. var. then operate on it.*
20. What is the concept of a “ref” and “const ref” argument in SystemVerilog function or task?
- ref: Allows modification in the original var.  
Const ref: read-only.*
21. What is the difference between “forever” and “for” in SystemVerilog?
- Unlimited iterations  
Limited*
22. Explain about the \$timeunit, \$timeprecision and ‘timescale’.
- \$timeunit: specifies time unit of delays in sims.  
\$timeprecision: specifies time units for display.  
`timescale: specifies both of the above.*
23. What is zero delay loop and What is the problem with zero delay loop?
24. Is it possible for a function to return an array?      **No**
25. How to make sure that a function argument passed as ref is not changed by the function?
- Using const ref*

23. A Loop that doesn't contain any delays  
*for i.e. while(1)*  
*Problem: It prevents other tasks in code from execution.*  
*- It will consume much CPU and memory and might end up causing system to crash.*

### Q13

```
module test();
 int c[$], b[$], a[$] = '{6, 9, 23, 63, 2, 6, 1, 1, 2, 7};

 initial begin
 int i;
 $display(a);
 b = a.unique();
 while(b.size() != 0) begin
 i = $urandom_range(0, b.size() - 1);
 c.push_front(b[i]);
 b.delete(i);
 end
 $display(c);
 end
endmodule
```

`'{6, 9, 23, 63, 2, 6, 1, 1, 2, 7}`  
`'{6, 7, 9, 2, 1, 63, 23}`