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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?

   → Each member has separate memory slot.
   → All members share same memory slot.

3. 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;
  int id;
  bit to_remove;
endclass

module top;
  widget q[$];
  initial begin
    widget w;
    int num = $urandom_range(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
```

→ defines a class named widget.
→ class has two members id, to_remove.
→ declares a queue of class widget objects type.
→ declares an object of type widget.
→ generates a random int. between (20-40)

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.
foreach (arr[i][j]) $display(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?

file.txt

```
aa
bb
cc
```

```
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 = cc

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.

19. Explain about pass by ref and pass by value? by ref: modifies the original var.
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 unit 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)
Problems: - 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}
```