**Comparator:**

module comparator\_2bit (

input [1:0] A,

input [1:0] B,

output A\_eq\_B,

output A\_gt\_B,

output A\_lt\_B

);

assign A\_eq\_B = (A == B);

assign A\_gt\_B = (A > B);

assign A\_lt\_B = (A < B);

endmodule

**Test-bench:**

`timescale 1ns / 1ps

module comparator\_2bit\_tb;

// Testbench signals

reg [1:0] A, B;

wire A\_eq\_B, A\_gt\_B, A\_lt\_B;

// Instantiate the comparator module

comparator\_2bit uut (

.A(A),

.B(B),

.A\_eq\_B(A\_eq\_B),

.A\_gt\_B(A\_gt\_B),

.A\_lt\_B(A\_lt\_B)

);

initial begin

$display("Time\tA\tB\tA\_eq\_B\tA\_gt\_B\tA\_lt\_B");

$monitor("%0t\t%b\t%b\t%b\t%b\t%b", $time, A, B, A\_eq\_B, A\_gt\_B, A\_lt\_B);

// Test all combinations

A = 2'b00; B = 2'b00; #10;

A = 2'b00; B = 2'b01; #10;

A = 2'b01; B = 2'b00; #10;

A = 2'b10; B = 2'b10; #10;

A = 2'b11; B = 2'b10; #10;

A = 2'b01; B = 2'b11; #10;

A = 2'b11; B = 2'b11; #10;

$finish;

end

endmodule

**Demux1to4:**

module demux1to4 (

input din,

input [1:0] sel,

output reg [3:0] y

);

always @(\*) begin

y = 4'b0000; // Default all outputs to 0

case (sel)

2'b00: y[0] = din;

2'b01: y[1] = din;

2'b10: y[2] = din;

2'b11: y[3] = din;

endcase

end

endmodule

**Test-bench:**

module demux1to4\_tb;

reg din;

reg [1:0] sel;

wire [3:0] y;

demux1to4 uut (

.din(din),

.sel(sel),

.y(y)

);

initial begin

$display("Time\tsel\tdin\ty");

$monitor("%0t\t%b\t%b\t%b", $time, sel, din, y);

din = 1;

sel = 2'b00; #10;

sel = 2'b01; #10;

sel = 2'b10; #10;

sel = 2'b11; #10;

din = 0; sel = 2'b10; #10;

$finish;

end

endmodule

**I solved some c-programs:**

#include<stdio.h>

int main(){

int a[100],n,i;

printf("enter the length of the array");

scanf("%d",&n);

printf("enter the array elements");

for(i=0;i<n;i++){

scanf("%d",&a[i]);

}

for(i=n-1;i>=0;i--){

printf("%d",a[i]);

}

}

#include <stdio.h>

int main() {

char str[100], temp;

int i = 0, j, length = 0;

printf("Enter a string: ");

scanf("%s", str);

while (str[length] != '\0') {

length++;

}

j = length - 1;

while (i < j) {

// Swap characters

temp = str[i];

str[i] = str[j];

str[j] = temp;

i++;

j--;

}

printf("Reversed string: %s\n", str);

return 0;

}

Largest element in array:

#include<stdio.h>

#include<string.h>

void main(){

int a[10]={1,2,3,4,64,23},g;

g=a[0];

for(int i=0;i<10;i++){

if(g<a[i]){

g=a[i];

}

}

printf("%d",g);

}

Find the number of set bit in decimal:

#include<stdio.h>

#include<string.h>

void main(){

int n;

printf("Enter a number");

scanf("%d",&n);

int count=0;

while(n>0){

if(n&1){

count+=1;

}

n=n>>1;

}

printf("%d",count);

}

Convert decimal to binary:

#include<stdio.h>

#include<string.h>

int main(){

int n,binary[32];

printf("Enter a decimal no:");

scanf("%d",&n);

if(n==0){

printf("Binary:0");

}

int i=0;

while(n>0){

binary[i]=n%2;

n=n/2;

i++;

}

printf("Binary:");

for(int j=i-1;j>=0;j--){

printf("%d",binary[j]);

}

}