

# Parking Management System

## Tools

- ModelSim
- Verilog

## Logic

### Available Spots

```
if (current_hour ≥ 8 && current_hour < 13) begin
    general_available_spots ≤ 200;
end else if (current_hour ≥ 13 && current_hour < 14) begin
    general_available_spots ≤ 250;
end else if (current_hour ≥ 14 && current_hour < 15) begin
    general_available_spots ≤ 300;
end else if (current_hour ≥ 15 && current_hour < 16) begin
    general_available_spots ≤ 350;
end else begin
    general_available_spots ≤ 500 - (parked_car - uni_parked_car);
end
```

### Car Entry

```
if (car_entered && (parked_car < TOTAL_SPOTS)) begin
    if (is_uni_car_entered && (uni_parked_car < UNI_SPOTS)) begin
        uni_parked_car ≤ uni_parked_car + 1;
        parked_car ≤ parked_car + 1;
    end else if (!is_uni_car_entered && (parked_car - uni_parked_car
< general_available_spots)) begin
        parked_car ≤ parked_car + 1;
    end
end
```

### Car Exit

```

if (car_exited && (parked_car > 0)) begin
    parked_car ≤ parked_car - 1;
    if (is_uni_car_exited && (uni_parked_car > 0)) begin
        uni_parked_car ≤ uni_parked_car - 1;
    end
end
end

```

## Vacated Space

```

vacated_space ≤ general_available_spots - (parked_car -
uni_parked_car);
uni_vacated_space ≤ UNI_SPOTS - uni_parked_car;
if(vacated_space > 0) begin
    is_vacated_space ≤ 1;
end
if(uni_vacated_space > 0) begin
    uni_is_vacated_space ≤ 1;
end
end

```

## TestBench

```

always #5 clk = ~clk;

initial begin
    clk = 0;
    reset = 1;
    current_hour = 0;
    car_entered = 0;
    is_uni_car_entered = 0;
    car_exited = 0;
    is_uni_car_exited = 0;

    #10;
    reset = 0;

    #10; current_hour = 8; car_entered = 1; is_uni_car_entered = 1;
    #10; car_entered = 0;
    #10; current_hour = 9; car_entered = 1; is_uni_car_entered = 0;
    #10; car_entered = 0;

```

```

#10; current_hour = 10; car_exited = 1; is_uni_car_exited = 1;
#10; car_exited = 0;
#10; current_hour = 11; car_exited = 1; is_uni_car_exited = 0;
#10; car_exited = 0;
#10; current_hour = 13; car_entered = 1; is_uni_car_entered = 0;
#10; car_entered = 0;
#10; current_hour = 14; car_entered = 1; is_uni_car_entered = 0;
#10; car_entered = 0;
#10; current_hour = 15; car_entered = 1; is_uni_car_entered = 1;
#10; car_entered = 0;
#10; current_hour = 16; car_entered = 1; is_uni_car_entered = 0;
#10; car_entered = 0;

#100;
$finish;
end

initial begin
    $monitor("Time: %0t | current_hour: %0d | uni_parked_car: %0d |
parked_car: %0d | uni_vacated_space: %0d | vacated_space: %0d |
uni_is_vacated_space: %b | is_vacated_space: %b",
            $time, current_hour, uni_parked_car, parked_car,
            uni_vacated_space, vacated_space, uni_is_vacated_space,
            is_vacated_space);
end

```

## Authors

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