Week 6 : Assignment 6

The due date for submitting this assignment has passed.

Due on 2021-09-08, 23:59 IST.

Assignment submitted on 2021-09-08, 13:03 IST

1) Which of the following statement(s) is/are true for designing complex digital systems? *1.25 points*

a. The system is partitioned into subparts, namely data path, control path and finite-state machine.
b. The system is partitioned into subparts, namely data path, control path and storage registers.
c. Complex system is partitioned into subparts, namely data path and control path.
d. All of these.

HINT: (If options a, b and c are all correct, select option d as the answer.)

- [ ] a.
- [ ] b.
- [x] c.
- [ ] d.

Yes, the answer is correct.
Score: 1.25
Accepted Answers:
c.

2) Which of the following types of functional units may be present in a data path? *1.25 points*

a. Counters/registers.
b. Clock and clear/reset signals.
c. Multiplexers/adders/other functional blocks.
d. All of these.

HINT: (If options a, b and c are all correct, select option d as the answer.)

- [ ] a.
- [ ] b.
- [x] c.
- [ ] d.

Partially Correct.
Score: 0.625
Accepted Answers:
a.
c.

3) Which of the following set of components are part of the data path and control path for the hardware module **multiplication by repeated addition** discussed in lecture 25. *1.25 points*

a. Data Path = {A, P, B, ADDER, COMP, LdA, LdP, clrP, LdB, decB, eqz, bus, data_in}
b. Data Path = {A, P, B, ADDER, COMP, eqz, bus}
c. Control Path = {LdA, LdP, clrP, LdB, decB, start, done, data_in, clk}
d. Control Path = { LdA, LdP, clrP, LdB, decB, done}

- [x] a.
- [ ] b.
- [x] c.
- [ ] d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.
d.

4) The control signal generation for the **multiplication by repeated addition** module discussed in lecture 25 is partially shown below. *1.25 points*

```
always @(state) begin
    case (state)
        S0: begin #1 LdA = 0; LdB = 0; LdP = 0; clrP = 0; decB = 0; end
        S1: begin #1 LdA = 1; end
        S2: begin #1 LdA = 0; LdB = 1; clrP = 1; end
        S3: begin #1 LdB = 0; LdP = 1; clrP = 0; decB = 1; end
        S4: begin #1 done = 1; LdB = 0; LdP = 0; decB = 0; end
        default: begin #1 LdA = 0; LdB = 0; LdP = 0; clrP = 0; decB = 0; end
    endcase
end
```

Which of the following statement(s) is/are true about the generation?

a. All the signal functions will be realized as combinational functions.
b. Each signal function will be realized by a 1-bit latch or flip-flop.
c. Some of the signal function will be realized by latch or flip-flop and others as combinational functions.
d. None of these.

HINT: (If options a, b and c are all false, select option d as the answer.)

- [ ] a.
- [x] b.
- [ ] c.
- [ ] d.

Yes, the answer is correct.
Score: 1.25
Accepted Answers:
b.

5) Which of the following design style is/are considered as recommended approach for modeling *1.25 points*

data and control path?

a. Both state change and computation are carried out in a clock triggered procedural block.
b. Only state change is carried out in a clock triggered procedural block.
c. Only computation is carried out in a clock triggered procedural block.
d. None of these.

HINT: (If options a, b and c are all incorrect, select option d as the answer.)

- a.
- b.
- c.
- d.

Yes, the answer is correct.
Score: 1.25
Accepted Answers:
b.

6) Assume the clock pulse is generated in the following way:

```
reg clk = 0;
always #10 clk = ~clk;
```

Simulating the **multiplication by repeated addition** discussed in lecture 25 with inputs

```
#3  start = 1'b1;
#23 data_in = 5;
#20 data_in = 3;
```

the outcome 15 will be observed after _____ (in decimal) clock periods with **done** signal indicating the end of computation.

70

Hint

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 6,7

1.25 points

7) Which of the following signal(s) is/are not parts of the data path in GCD computation discussed in lecture 26?

1.25 points

a. The signal LdA for loading data in register A.
b. The signal LT indicating value stored in register A is less than that of register B.
c. The signal done indicating the end of GCD computation.
d. None of these.

HINT: (If options a, b and c are all incorrect, select option d as the answer.)

- [ ] a.
- [ ] b.
- [x] c.
- [ ] d.

Partially Correct.
Score: 0.625
Accepted Answers:
a.
c.

8) Which of the following statements is/are true about the two approaches for modeling GCD computation discussed in lecture 26?

1.25 points

a. Both the approaches required identical hardware components when synthesized.
b. Alternate approach requires more storage than previous one.
c. Alternate approach requires less storage than previous one.
d. None of these.

HINT: (If options a, b and c are all incorrect, select option d as the answer.)

- a.
- b.
- c.
- d.

Yes, the answer is correct.
Score: 1.25
Accepted Answers:
b.

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