

CS2020 FALL Assignment 6

October 23, 2020

Question 1

To control the signal flow in a processor, different types of switches are added. In the lecture note, two types of switches are introduced.

- (a) State the names of the switches.
- (b) For each type of switches, what input signal will lead to the action 'disconnection'?

Question 2

The processors as shown in Figure 1 and Figure 5 have two different designs on the register-sector. State the advantage(s) and disadvantage(s) of their designs.

Question 3

With reference to the processor with architecture as shown in Figure 1, design the micro-instructions for the following logical operations. It is assumed that the value of A (resp. B) has already been stored in the register RA (resp. RB). The outcome Z is going to be stored in the register RZ .

- (a) $R1 = \neg A$.
- (b) $R2 = \neg B$.
- (c) $Z = \neg A \oplus \neg B$.
- (d) $Z = A + (\neg A \oplus \neg B)$.

Question 4

With reference to the processor with architecture as shown in Figure 5, design the micro-instructions for the following logical operations. It is assumed that the value of A (resp. B) has already been stored in the register RA (resp. RB). The outcome Z is going to be stored in the register RZ .

- (a) $R1 = \neg A$.

(b) $R2 = \neg B$.

(c) $Z = \neg A \oplus \neg B$.

(d) $Z = A + (\neg A \oplus \neg B)$.

Question 5

- (a) With reference to Figure 7, what types of signals have to be sent from the processor to the memory if a data has to be written from the processor to the memory?
- (b) With reference to Figure 7, what is the use of the clock?
- (c) Which module in a processor is responsible to convert an instruction to a sequence of micro-instructions?
- (d) Describe what is memory access time.
- (e) State the full names of ROM and RAM.
- (f) What are the general usages of ROM and RAM?