CS202 · Computer Organization

Homework 2

刘乐奇 / 12011327

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1 Problem 1

R-type instruction.
First, separate the binary code into 6 parts: 000000 10000 10000 10000 00000 100000
Since the first 6-bit (op) is 000000, this code is R-type instruction. By looking up the list, we can know it operates as add with 0 shift since the last 6-bit (funct) and the second last 5-bit (shamt). Besides, 10000 represents the register $s0, which simultaneously is rs, rt, rd. Therefore, the assembly instruction is
add $s0, $s0, $s0

2 Problem 2

I-type instruction.
By looking up the list, in binary, we can find the machine code for sw as 101011, for $t1 as 01001, for $t2 as 01010. With the shift 0010 0000, we have the machine code in hexadecimal as
0xad2a0020

3 Problem 3

```
sll $t0, $s3, 2
add $t0, $t0, $s6
lw $t0, 0($t0)
sll $t1, $s4, 2
add $t1, $t1, $s6
lw $t1, 0($t1)
add $t2, $t0, $t1
sw $t2, 32($s7)
```

4 Problem 4

1. Initially, we have $t1 to the value 10, $s2 to the value 0. In each loop, it will per form that value in $t1 is decreased by 1 and value in $s2 is increased by 2. The loop will be ended until value in $t1 is equal to 0. At last, **the value in $s2 is 20**.

2.

$$
\begin{aligned}
&while(0 < i)\\
&\{\\
&\quad i = i - 1;\\
&\quad B = B + 2;\\
&\}
\end{aligned}
$$

5 Problem 5

```
lui $t1, 8193
ori $t1, $t1, 18724
```