

## Chapter 2 Questions - Assignment Questions for Week 2

### 2.1

[2.1] [5] §2.2 For the following C statement, write the corresponding RISC-V assembly code. Assume that the C variables `f`, `g`, and `h`, have already been placed in registers `x5`, `x6`, and `x7` respectively. Use a minimal number of RISC-V assembly instructions.

```
f = g + (h - 5);
```

### 2.2

[2.2] [5] §2.2 Write a single C statement that corresponds to the two RISC-V assembly instructions below.

```
add f, g, h
add f, i, f
```

### 2.3

[2.3] [5] §§2.2, 2.3 For the following C statement, write the corresponding RISC-V assembly code. Assume that the variables `f`, `g`, `h`, `i`, and `j` are assigned to registers `x5`, `x6`, `x7`, `x28`, and `x29`, respectively. Assume that the base address of the arrays `A` and `B` are in registers `x10` and `x11`, respectively.

```
B[8] = A[i - j];
```

### 2.4

[2.4] [10] §§2.2, 2.3 For the RISC-V assembly instructions below, what is the corresponding C statement? Assume that the variables `f`, `g`, `h`, `i`, and `j` are assigned to registers `x5`, `x6`, `x7`, `x28`, and `x29`, respectively. Assume that the base address of the arrays `A` and `B` are in registers `x10` and `x11`, respectively.

```
slli x30, x5, 3 // x30 = f*8
add x30, x10, x30 // x30 = &A[f]
slli x31, x6, 3 // x31 = g*8
add x31, x11, x31 // x31 = &B[g]
ld x5, 0(x30) // f = A[f]
addi x12, x30, 8
ld x30, 0(x12)
add x30, x30, x5
sd x30, 0(x31)
```

### 2.5

[2.5] [5] §2.3 Show how the value `0xabcdef12` would be arranged in memory of a little-endian and a big-endian machine. Assume the data are stored starting at address 0 and that the word size is 4 bytes.

### 2.7

[2.7] [5] §§2.2, 2.3 Translate the following C code to RISC-V. Assume that the variables `f`, `g`, `h`, `i`, and `j` are assigned to registers `x5`, `x6`, `x7`, `x28`, and `x29`, respectively. Assume that the base address of the arrays `A` and `B` are in registers `x10` and `x11`, respectively. Assume that the elements of the arrays `A` and `B` are 8-byte words:

```
B[8] = A[i] + A[j];
```

### 2.10

Assume that registers `x5` and `x6` hold the values `0x8000000000000000` and `0xD000000000000000`, respectively.