

CSCI 254: Introduction to Computer Organization
Last term's Midterm #2

These multiple choice questions were from the closed book section of the second midterm in Fall 1993.

When discussing computer organization, the abbreviation "PC" usually means

- A: procedure control.
- B: politically correct.
- C: program counter.
- D: printed circuits.

A three-state gate will not effect the value of the bus, when the gate

- A: is 0.
- B: is 1.
- C: is in the high-impedance state.
- D: is in the high-input state.

The two major types of computer control organization are

- A: micro-programmed and hardwired.
- B: milli-programmed and hardwired.
- C: TTL and ECL.
- D: assembler and machine language.

When a computer instruction is executed, the phase in which the opcode is discovered is called the

- A: instruction decode phase.
- B: instruction fetch phase.
- C: register transfer phase.
- D: memory map phase.

The hexadecimal number 4D can be written as the boolean digits

- A: 00101101.
- B: 01001001.
- C: 01001101.
- D: 10110010.

The number of different logic operations that can be performed with two different binary variables is

- A: 4.
- B: 8.
- C: 16.
- D: 32.

People who work with computers think that 256k means

- A: 256,000.
- B: 258,381.
- C: 260,415.
- D: 262,144.

You would expect computer instructions designed to call a subroutine to save

- A: useful registers.
- B: the accumulator.
- C: a return address..
- D: an interrupt vector..

If the opcode is encoded in 5 bits, the computer will have

- A: exactly 5 instructions.
- B: up to 16 instructions.
- C: up to 32 instructions.
- D: exactly 32 instructions.

The control operation that sets a register to zero is usually called

- A: low.
- B: clear.
- C: ground.
- D: init.

These are the questions for the open book section

Problem 1. (10 points)

Represent the following Pascal statement in register transfer language:

```
IF (P OR Q) THEN AR := DR ELSE PC := AR+1;
```

Problem 2. (12 points)

If ten-bit registers DR and TR have the following values

```
DR  1101000111
```

```
TR  1010101011
```

what is the value of the following three expressions?

```
TR+DR
```

```
DR  TR
```

```
cir TR          cir is circular shift right
```

Problem 3. (14 points)

How would you set the control inputs of the bus system shown in Figure 5-4 on page 130 of the textbook to execute the following *two* concurrent RTL statements?

```
DR  0, TR  IR
```

Problem 4. (16 points)

Suppose memory locations 20A through 20E of the "basic computer" described in Table 5-2 on page 133 of the textbook contain the following values:

```
20A  220E
```

```
20B  520D
```

```
20C  7020
```

```
20D  7001
```

```
20E  BEEF
```

where all address and data values are expressed in hexadecimal numbers. If the computer starts executing the code at address 20A, what are the contents of the AC and memory locations 20A through 20E when the computer halts?

Problem 5. (18 points)

Express the following Pascal statement

```
IF (X<0) THEN X := -X ;
```

in the assembly language of the textbook's basic computer. It requires about six instructions.