

University Computer Science

Name: _____ Score: _____

1. What is the unsigned binary number 101101 in decimal?

2. Any logic circuit can be built using only NAND gates.

☐ True ☐ False

3. In fetch-decode-execute, the instruction register (IR) is loaded during –

- ☐ fetch
- ☐ decode
- ☐ execute
- ☐ the next branch

4. In `lw R1, 0(R2)` the 0 is –

- ☐ the opcode
- ☐ the value zero being loaded
- ☐ a register number
- ☐ the offset added to base register R2

5. Two threads of the same process share that process's memory.

☐ True ☐ False

6. The preprocessor checks that a macro is used with the right types.

☐ True ☐ False

7. What is the largest unsigned number that 10 bits can hold?

8. How many rows does the full truth table of a 3-input gate have?

9. The PC holds 1000 and every instruction is 4 bytes. After three instructions with no branch, what does the PC hold?

10. R2 holds 400. Which memory address does `lw R1, 12(R2)` read?

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1. **45**

$$32 + 8 + 4 + 1 = 45.$$

2. **True**

NAND is universal. For example, NOT a is a NAND a, and AND is a NAND followed by a NOT.

3. **fetch**

Fetch reads memory at the PC into the IR; decode then interprets it.

4. **the offset added to base register R2**

Address = R2 + 0. This is base + offset addressing.

5. **True**

Threads live inside one address space. Separate processes each get their own.

6. **False**

The preprocessor only swaps text. Types are checked later, by the compiler.

7. **1023**

$$2^{10} - 1 = 1024 - 1 = 1023.$$

8. **8**

Each input is 0 or 1, so there are $2^3 = 8$ rows.

9. **1012**

$$1000 + 3 \times 4 = 1012.$$

10. **412**

$$\text{Base} + \text{offset} = 400 + 12 = 412.$$