

Microprocessors Spring 2021 final test

1. How many memory references (including instruction fetch) does a microprogrammed single accumulator microprocessor need to run an 'add to memory' instruction $M[ADRS]=M[ADRS]+AC$
a. 4 b. 5 c. 6 d. 7 e. 8
2. Which of the following microprocessor organizations runs $X=(A+B)/(C-D)$ arithmetic expression in less time
a. Single accumulator organization
b. Multiple register organization with two addresses
c. Multiple register organization with three addresses
d. Organization have no effect on run time
e. None
3. Which of the following is not one of the reasons that microprocessors have addressing modes
a. pointers to memory b. counters for loop control
c. indexing of data for arrays d. program relocation
e. register renaming
4. The minimum number of bits to represent implied mode instructions of a microprocessor with 12 instructions, 4 addressing modes and 4 general purpose registers is
a. 5 b. 6 c. 7 d. 8 e. 9
5. Immediate addressing mode instructions
a. are used to initialize registers to constant values
b. executes faster than direct and indirect address instructions since operands can be specified without additional memory references
c. are shorter so have a better chance to reside in cache
d. generally run faster due to sequential memory access compared to random operand address access of direct and indirect modes
e. all
6. Why is it impossible to use register addressing mode for all variables in all C programs (for example register prefix in C variable definition: register int a)
a. Most of the programs (except a few simple) tend to use more variables than the number of registers in microprocessors
b. C compilers optimize the use of register variables automatically and do not allow users to define variables in registers even register mode addressing is available
c. Initializing register variables is slower in C than initializing variables defined in memory
d. Modifying register variables in C may have side effects as registers are used by other programs and operating systems
e. C programs run faster if all variables are defined in memory
7. Why some microprocessors incorporate a special mode that automatically increment (or decrement) the content of the register after the memory data is accessed in register indirect addressing mode
a. it is easier to define loops if processor autoincrements (autodecrements) the register value
b. autoincrement (autodecrement) execute slower than using increment (decrement) instruction
c. arrays in memory can be accessed easier sequentially
d. arrays in memory can be accessed easier randomly

e. None

8. Direct mode unconditional Branch instruction is at address 768. Which of the following is true after the instruction is executed assuming PC=768, M[769]=750

- a. PC=770 b. M[769]=768 c. PC=750 d. AC=750
e. None

9. Direct address mode Store AC instruction (STA) is at address 320. Which of the following is correct after the instruction is executed assuming PC=320, AC=345, M[321]=380

- a. PC=323 b. M[380]=345 c. PC=345 d. M[380]=320
e. None

10. How many times does the control unit refer to memory when it fetches and executes a one word register indirect addressing mode instruction

- a. 5 b. 4 c. 3 d. 2 e. 1

ANSWERS

1 A, 2 C, 3 E, 4 D, 5 E, 6 A, 7 C, 8 C, 9 B, 10 D