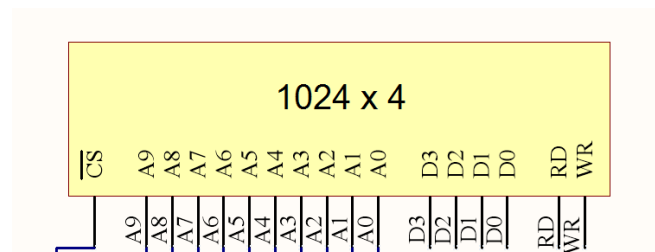


Name: _____ Student #: _____ Signature: _____

Time limit: 30 min. Calculators not allowed. All programming questions relate to the NIOS II processor.

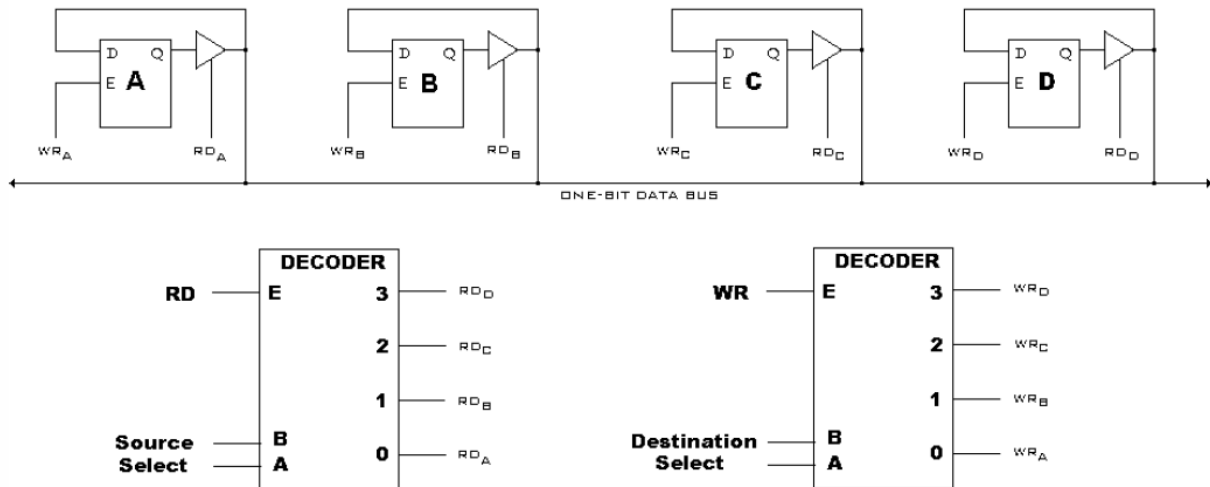
1. (1 mark) Use an assembler directive to tell the assembler to begin placing binary values at memory address 0x00001200.

2. (2 marks) Explain why switch debouncing is necessary when interfacing real switches to digital circuits:
3. (3 marks) List the 3 pieces of information that must be provided to the CPU of a computer when giving an instruction in machine language or assembly language:
4. (5 marks) Draw and label a block diagram of a single port **1024x4** read write memory chip. Ensure that the memory chip includes **an active low chip select line, all address lines, all data lines, a read line, and a write line**. What is the storage capacity of this memory chip in bytes?



Name: _____ Student #: _____ Signature: _____

5. (7 marks) Given the circuit below, the value in the source register (B) is to be copied into a destination register (C) by specifying a two-bit address for each. Single read and write signals are directed to the appropriate one-bit registers. Label completely the timing diagram to perform the register transfer. Assume output Q_B is initially 0 and output Q_C is initially 1.



Source
Address

Dest.
Address

	1
Q_B	0
	1
WR	0
	1
RD	0
	1
Q_C	0
	1
$DATA$	1
BUS	0