

## COMP 3350 - HOMEWORK 2: x86 ORGANIZATION BASICS

### QUESTION 1

- |                        |                        |   |
|------------------------|------------------------|---|
| 1. EAX - Accumulator   | 5. EBP - Base pointer  | These 4 cannot be addressed in parts of 8-bits. |
| 2. EBX - Base register | 6. ESP - Stack pointer |   |
| 3. ECX - Loop counter  | 7. ESI - Source index  |   |
| 4. EDX - Data register | 8. EDI - Data index    |   |

### QUESTION 2

When the below flags are '1', they indicate...

- Sign (SF) - Result is negative
- Zero (ZF) - Result is zero
- \* Carry (CF) - Unsigned arithmetic out of range
- Auxiliary Carry (AF) - Carry from bit 3 to bit 4
- Parity (PF) - Sum of 1 bits is an even number
- \* Overflow (OF) - Signed arithmetic out of range

### QUESTION 3

Cache memory stores recently or frequently accessed data. Faster, but less dense. No refresh.

### QUESTION 4

No, application programs can access any area of memory in real-address mode.  
In protected mode, each program is assigned a memory partition which is protected from other programs.

### QUESTION 5

$$20 \text{ address lines} = 2^{20} \text{ addresses} = \boxed{1,048,576 \text{ addresses (1 MB)}}$$

### QUESTION 6

$$\frac{1}{5 \text{ GHz}} = \frac{1}{5 \times 10^9} = 0.2 \text{ ns/clock cycle} \Rightarrow 5 \text{ clock cycles} \times 0.2 \text{ ns/clock cycle} = \boxed{1 \text{ ns}}$$