CS 345 HW #1

1A. TO "INTERRUPT" THE SYSTEM AND TELL IT TO PERFORM CERTAIN ACTIONS.

B. INTERRUPTS ARE HARDWARE, TRAPS ARE SOFTWARE.

C. TO FORCE A CERTAIN PART OF CODE TO RUN (I.E. HANDLERS) AND TO ACHIEVE CERTAIN BEHAVIORS IN A PROGRAM.

D. DIRECT MEMORY ACCESS CAN TAKE OVER I/O SO THE PROCESSOR CAN HANDLE THE OTHER WORK IT NEEDS TO.

2A. i IS SPATIALLY LOCAL, IT IS INCREMENTING BY 1 ONLY OCCASIONALLY.

B. A[i] IS TEMPORALLY LOCAL, IT IS GETTING REFERENCED EVERY J ITERATION.

3A. $83.89

B. $838.86

C. H = .9967 OR $\frac{19}{120}$

4. $T_C = 20$ $T_M = 80$ $T_{VM} = 12,000,080$

$H_C = .9$ $H_M = .1 \times .6$ $H_{VM} = .1 \cdot .4$

$H_{AMS} = (H_C \times T_C) + (.1 \times [(.6 \times T_M) + (.4 \times T_V)]) = 480026$ NS

5A. RAW DATA, MEMORY ACCESS, EXTERNAL CONNECTIONS

B. I/O, RAM, PROCESSOR FUNCTIONS, INTERRUPTS,

C. BATTERY POWER, DISPLAY FUNCTIONALITIES, QUICK STATE-SWITCHING (ON/OFF), PROCESSOR POWER FOR PROCESSES/PROGRAMS.

6. REGISTERS ARE PART OF THE PROCESSOR, WHICH CAN BE DIRECTLY AFFECTED BY THE OS. THE OS WILL STORE DATA IN REGISTERS.
INTERRUPTS IMPROVE PROCESSOR UTILIZATION, SO THAT THE PROCESSOR CAN BE FREE FOR THE MOST IMPORTANT TASKS.
CACHING ALLOWS FOR FREQUENTLY ACCESSED DATA TO BE FOUND FASTER, SPEEDING UP NECESSARY READS FOR THE OS.
I/O IS SLOW, SO THE OS WILL USE INTERRUPTS TO ITS ADVANTAGE, TAKING I/O JOBS AWAY FROM THE PROCESSOR.
AN OS NEEDS SECURITY, SO PROTECTIONS HAVE TO BE BUILT IN, ESPECIALLY WITH MULTIPLE USERS.