

Faculty of Engineering, KFS University
Subject computer Architecture exam (ECS3009)



Date: 17/6 / 2021, 2nd term final exam

examiner: prof. Ali Sakr 3rd year, computer and control systems dep.

Full marks 60 M, Solve the next problems, each question is assigned to 10Marks

the exam fulfils the NARS topics a.3, a. 4, a. 8. ,a.19, b.2, b.6, b.7, C3,C17

- 1- a-Discuss evaluation metrics for cache, **how to optimize cache characteristics**
b-Explain **the need for Virtual Memory, how access table is used.**
c- discuss levels of disk RAID,
d-compare fixed and dynamic memory segments,
e- discuss **Handshaking**, how ISR act
- 2 a- discuss types of touch screen technologies
b Define pipeline; how can speed up processing
c Define type of interrupt
d Compare CISC & RISC
e Compare Variable Length vs Fixed-Length Instructions, what are privileges of each type?
- 3 regarding speed up equation:

$$\text{Speedup}_{\text{overall}} = \frac{\text{ExTime}_{\text{old}}}{\text{ExTime}_{\text{new}}}$$

If cache speed is doubled, swapping takes 50% of process manipulation. what is the % of improve in execution time, what is the overall speed up, define sensitivity of overall speed up regarding the enhanced speed up,

- a $\text{Speedup}_{\text{overall}}$
- b $\text{Speedup}_{\text{enhanced}}$

- 4 a for the execution time driven by equation:
 $T_{\text{exec}} = N_{\text{of instructions}} * \text{CPI} * T_{\text{of cycle}}$
Compute the execution time for a program includes 5000 instruction, average CPI= 4.5, clock rate = 2.5 Ghz

b-compute average CPI for the next combination of instructions, and . Find **MFLOPS**

operation	Frequency (% in program)	Cycles/ instruction
add	15%	8
mul	10%	150
div	4%	160
Float point	10%	200
Logic	4%	2
load	11%	6
store	6%	4
Branch (conditional)	10%	8
Branch (not conditional)	20%	6
Call lib	10%	10

5- let 3 computers tested on 3 benchmark programs, the execution times shown in table, compare which is faster?

Program	Com. A	Com. B	Com. C
P1 (sec)	10	10	20
P2 (sec)	500	100	50
P3 (sec)	50	100	80

What if frequency of repeating program 1 is 40% , program 2= 30%, program3 =30%

6-a- define Programmed I/O, Interrupt-Driven I/O, DMA

b= define Problems with Clock Speed and Logic Density?

c-define WAR,WAW, VLIW, write back, write through,

best wishes,,,