We hereby swear that the work done on this exam is totally my own; and my honor, I have neither given nor received any unauthorized help for this exam. I understand that by the school code, violation of these principles will lead to a zero grade and is subject to harsh discipline issues.

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1) a) LAS = 2^{48} byte
PAS = 2^{46} byte

*pages = $\frac{2^{48}}{64KB} = 2^{48-16} = 2^{32}$ pages

*frames = $\frac{2^{46}}{64KB} = 2^{46-16} = 2^{30}$ pages → 32bit container

Size = $2^{32} \times 4 = 2^{34}$ byte (for each page)

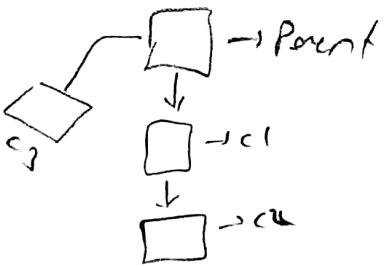
b) Memory Access = 90ns
hit ratio = 0.99
TLB = 7ns

EAT = 0.99 (7 + 90) + 0.01 (7 + 90 + 90) = ____

(0.99: if page is in the TLB; 0.01: otherwise, 2 memory access + TLB time)

c) If we increase the size of page table, searching page time will be longer.
And also page table will hold much more space in memory, so in that point we can divide page table into several page tables (outer, inner)

2) A
D
B
C



c1, c2, parent, c3

3)

Sem0	Sem1	Sem2	Sem3	Sem4	Sem5
0	0	0	0	0	0
X0	X0	X0	X0	X0	(1)

Sem5 → foo() → func3

→ func30 func31 func32 func33 func34 func25 func26 func27 func28 func29
with parenthesis!!!