

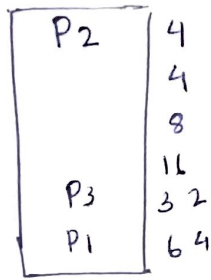
DIGITAL ASSIGNMENT

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1)

First Fit



$P_1 - 37$

$P_2 - 3$

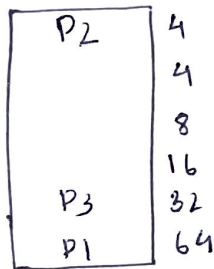
$P_3 - 22$

$P_4 - 29$

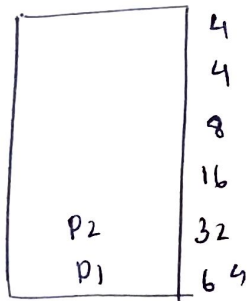
$P_5 - 54$

$P_6 - 49$

Best Fit



Worst Fit



2. No of entries = (virtual address space size) / (page size)

There are $2^{32-12} = 2^{20}$ entries in page table

No of bits ^{required} to address the 64 MB memory = 26

$\Rightarrow 2^{26-12} = 2^{14}$ page frames in physical memory

\Rightarrow each page table entry will contain 14 bits
Since memory is byte addressable each page table entry is 16 bits

Size of page table, total no of pages \times size of page table entry
 $= 2^{20} \times 2 = \underline{\underline{2 \text{ MB}}}$

3
a) frame of page 2 is 7

$$7 \times 1024 = 7168$$

$$\text{after adding offset} = 7168 + 85 = \underline{\underline{7253}}$$

b) Using the same procedure

frame of page 3 is 3

$$3 \times 1024 = \underline{\underline{3072}}$$

$$\text{adding offset} = 3072 + 555 = 3627$$

c) frame of page 3 is 3

$$3 \times 1024 = 3072$$

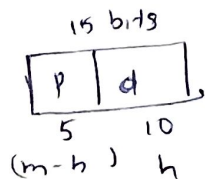
$$\text{adding offset} = 3072$$

Since offset is larger than page size
address is 1024

4. 1024 words contain 2^{10} bits

The logical address space is $32 = 2^5$

a) logical address = $10 + 5 = 15$



$$m = 15$$

$$h = 10$$

b) no. of physical frames ~~are~~ = $16 = 2^4$

Physical address = $4 + 10 = 14$ bits long

a) Page table size = 64 entries = 2^7

Page number = 7 bits

b) Page size = 512

Total pages = 64

Total physical memory = $64 * 512 = 2^{15}$

Therefore offset = 5 bits

c) ~~Logical address space = $2^{12} = 4K$~~

Page number bits + offset bits = $7 + 5 = 12$ bits

d) Logical address space = $2^{12} = 4K$

e) Size of ram / page size = inverted page table entries

$$= \frac{256 \times 1024}{4} = 65536 \text{ entries}$$

7. Physical Address = starting address + offset

a. $198 < 256$

Physical add = $600 + 198 = 798$

b. $156 < 198$

P.A = $222 + 156 = 378$

c. $530 > 198$

Segmentation fault

d. $222 < 248$

P.A = ~~600~~ $600 + 222 = 822$

8. Effective access time = hit ratio \times time during hit + miss ratio \times time during miss

$$TLB = 15 \text{ ns}$$

$$\text{Memory time} = 150 \text{ ns}$$

$$\text{Hit ratio} = 75\%$$

$$E.A.T = 0.75 \times 15 + 0.25 \times 165 = 202.5 \text{ ns}$$

10. A page fault occurs when an access to a page that has ~~been~~ not been brought into main memory takes place. The OS verifies memory access, aborting program if invalid. If its valid a free frame is located and I/O is requested to read the needed page into the free frame. Upon completion of I/O, the process table and page table are updated and the instructions restarted.

b.



c.