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Questions : 21

Question 21:

Consider a scenario of demand paged memory. Page table is held in registers. It takes 8 milliseconds to service a page fault if an empty page is available or the replaced page is not modified and 20 milliseconds if the replaced page is modified. Memory access time is 100 nanoseconds. Assume that the page to be replaced is modified 70 percent of the time. Generate a solution to find maximum acceptable page-fault rate for access time that is not more than 200 nanoseconds.

Description:

In the above question we will use demand paged memory. where page table is held in registers

time to service a page fault

time to modify a replaced page

memory access time

percentage of time taken to modify a replaced page

maximum acceptable page-fault rate

effective access time

are all given and here we want to find maximum acceptable page-fault rate.

Code Snippet:

```
#include<stdio.h>
#include<unistd.h>
#include<stdlib.h>
#include<conio.h>
int main()
{
    float pnmt;    //time to service a page fault(replaced page is not modified).
    float pmt;     //time to service a page fault(replaced page is modified).
    float mat;     //memory access time.
    float mper;    //percentage of time taken to modify a replaced page.
    float nmper;   //percentage of time left from modification of replaced page.
    float time;    //maximum acceptable page-fault rate.
    float mpfr;    //which page-fault rate access time is not more than the given time.

    printf("\nTo find maximum page-fault rate enter the values of the following:-\n");
    printf("\nEnter the time to service a page fault\n \nIf replaced page is not modified\n(milliseconds) :\n");
    scanf("%f",&pnmt);
    printf("\nIf replaced page is modified (milliseconds) :\n");
    scanf("%f",&pmt);
    printf("\nEnter the memory access time (nanoseconds) :\n");
    scanf("%f",&mat);
```

```

    printf("\nEnter the modified percent :\n");
    scanf("%f",&mper);
    printf("\nEnter the not modified percent :\n");
    scanf("%f",&nmper);
    printf("\nEnter the time for which page-fault rate access time is less than :\n");
    scanf("%f",&time);
    mpfr=((time-mat)/(((mper/100)*(pmt*1000000))+((nmper/100)*(pnmt*1000000))-
mat));
    mpfr=mpfr*100;
    printf("\nmaximum acceptable page-fault rate : %f%%\n",mpfr);
}

```

Test cases:

The screenshot shows a C++ IDE with the source code for Q21.cpp on the left and its execution output in a terminal window on the right.

Source Code (Q21.cpp):

```

1 #include<stdio.h>
2 #include<conio.h>
3 int main()
4 {
5     float pnmt;
6     float pmt;
7     float mat;
8     float mper;
9     float nmper;
10    float time;
11    float mpfr;
12
13    printf("\nEnter the time to service a page fault : ");
14    scanf("%f",&pmt);
15    printf("\nEnter the time for which page-fault rate access time is less than : ");
16    scanf("%f",&time);
17    printf("\nEnter the modified percent : ");
18    scanf("%f",&mper);
19    printf("\nEnter the not modified percent : ");
20    scanf("%f",&nmper);
21    printf("\nEnter the time for which page-fault rate access time is less than : ");
22    scanf("%f",&time);
23    printf("\nEnter the modified percent : ");
24    scanf("%f",&mper);
25    printf("\nEnter the not modified percent : ");
26    scanf("%f",&nmper);
27    printf("\nEnter the time for which page-fault rate access time is less than : ");
28    scanf("%f",&time);
29    mpfr=((time-mat)/(((mper/100)*(pmt*1000000))+((nmper/100)*(pnmt*1000000))-
mat));
30    mpfr=mpfr*100;
31    printf("\nmaximum acceptable page-fault rate : %f%%\n",mpfr);
32}

```

Execution Output:

```

To find maximum page-fault rate enter the values of the following:-
Enter the time to service a page fault : 100
If replaced page is not modified (milliseconds) : 80
If replaced page is modified (milliseconds) : 200
Enter the memory access time (nanoseconds) : 100
Enter the modified percent : 70
Enter the not modified percent : 90
Enter the time for which page-fault rate access time is less than : 200
Maximum acceptable page-fault rate : 0.000610%
Process exited after 44.07 seconds with return value 0
Press any key to continue . . .

```

In the above snap there we have given required attributes
And the output is displayed