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Branch - CBA Batch - 41
OS Practical 6

Question - 1 :

Mr. Hitesh Pundit is working as a Branch Manager of Royal Indies Bank. On 14 February the cash collected from four from Single Window Operators cum cashiers of the bank as per below table:

Window No.	Cashier Name	Currency Collected
1	Mr. Anuj Dixit	100 Rs X 1580 Notes 200 Rs X 239 Notes 500 Rs X 276 Notes 2000 X 88 Notes
2	Mr. Ashish Pandey	100 Rs X 3320 Notes 200 Rs X 292 Notes 500 Rs X 232 Notes 2000 X 37 Notes
3	Mrs. Surita Kashyap	100 Rs X 1200 Notes 200 Rs X 39 Notes 500 Rs X 276 Notes 2000 X 46 Notes
4	Mr. Mrunal Sharma	100 Rs X 660 Notes 200 Rs X 209 Notes 500 Rs X 633 Notes 2000 X 55 Notes

Code :

```
#include"stdio.h"
#include"pthread.h"

int a[4]={100,200,500,2000};

int b[4][4]={{1580,239,276,88},{3320,292,232,37},{1200,39,276,46},{660,209,633,55}};
int p=0;
int total=0;

void *count(){
    int sum=0;
    int k=p++;
    for(int i=0;i<4;i++){
        total+=a[i]*b[k][i];
        sum+=a[i]*b[k][i];
    }
```

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```
}

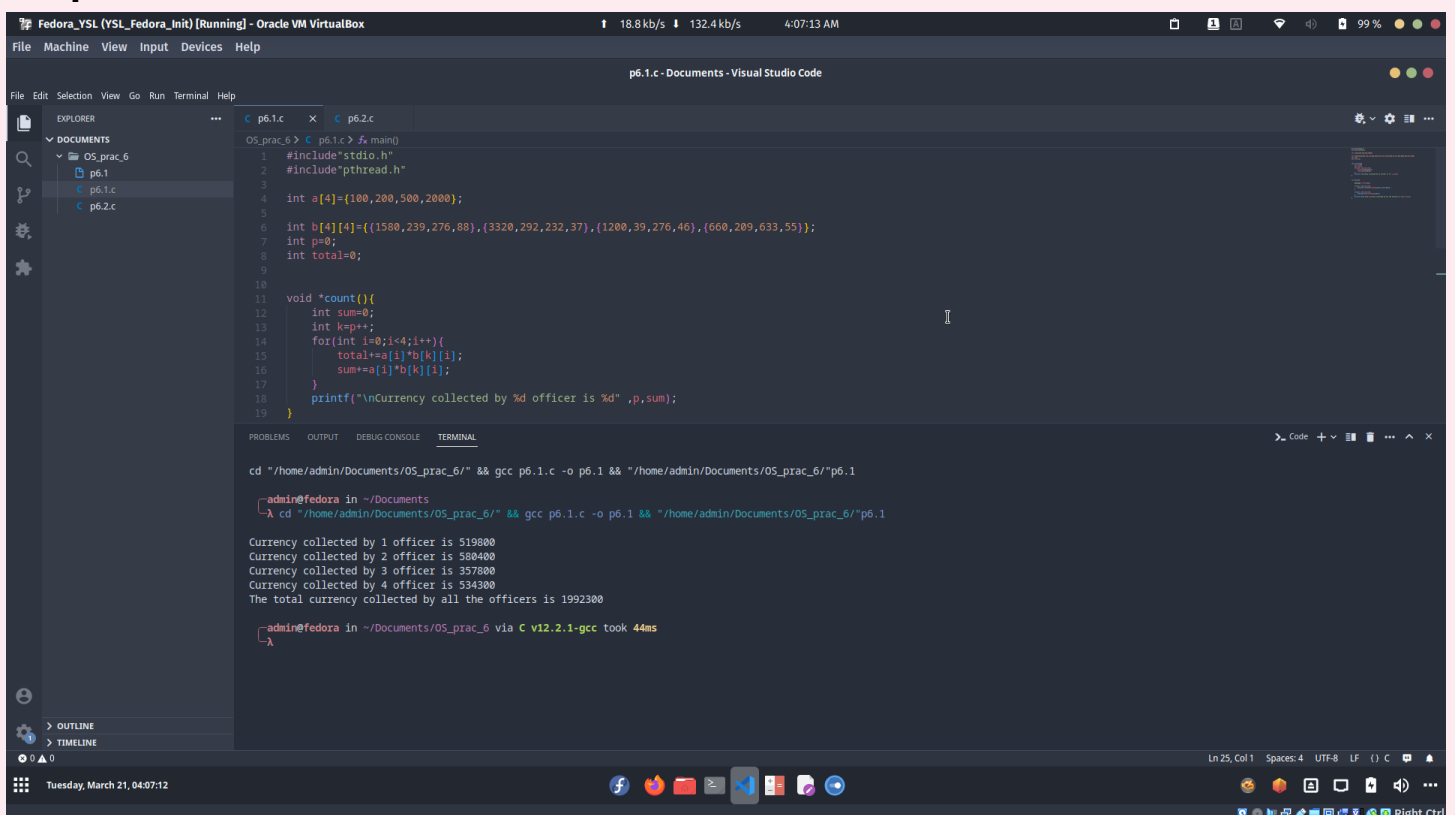
printf("\nCurrency collected by %d officer is %d" ,p,sum);
}

int main() {

    pthread_t threads[4];

    for(int i=0;i<4;i++){
        pthread_create(&threads[i],NULL,count,NULL);
    }
    for(int i=0;i<4;i++){
        pthread_join(threads[i],NULL);
    }
    printf("\nThe total currency collected by all the officers is %d\n",total);
}
```

Output :



The screenshot shows a Visual Studio Code editor window titled "Fedora_YSL (YSL_Fedora_Init) [Running] - Oracle VM VirtualBox". The editor is open to a file named "p6.1.c" in the "Documents" folder. The code in the editor is a C program that uses pthreads to calculate the total currency collected by four officers. The code is as follows:

```
1 #include<stdio.h>
2 #include<pthread.h>
3
4 int a[4]={100,200,500,2000};
5
6 int b[4][4]={{(1580,239,276,88)},{3320,292,232,37},{1200,39,276,46},{660,209,633,55}};
7 int p=0;
8 int total=0;
9
10
11 void *count(){
12     int sum=0;
13     int k=p++;
14     for(int i=0;i<4;i++){
15         total+=a[i]*b[k][i];
16         sum+=a[i]*b[k][4];
17     }
18     printf("\nCurrency collected by %d officer is %d" ,p,sum);
19 }
```

The terminal window shows the output of the program:

```
cd ~/home/admin/Documents/OS_prac_6/" && gcc p6.1.c -o p6.1 && "/home/admin/Documents/OS_prac_6/"p6.1
-admin@fedora in ~/Documents
-A cd ~/home/admin/Documents/OS_prac_6/" && gcc p6.1.c -o p6.1 && "/home/admin/Documents/OS_prac_6/"p6.1
Currency collected by 1 officer is 519800
Currency collected by 2 officer is 580400
Currency collected by 3 officer is 357800
Currency collected by 4 officer is 534300
The total currency collected by all the officers is 1992300
-admin@fedora in ~/Documents/OS_prac_6 via C v12.2.1-gcc took 44ms
-A
```

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Question - 2 :

Being a Branch Manager, he would like to know the Closure Balance of his branch on a daily basis on his dashboard. Design the parallel algorithm and write a code in any language of your choice which can calculate the total cash collected by the branch on 14 February 2022. [Hint: Cash calculation must be done on the basis currency collected and $\frac{1}{4}$ of the task to be done by each Single Window Operators cum cashiers

Code :

```
#include "stdio.h"
#include "pthread.h"
#define MAX 16
#define MTHREAD 4

int a[]={1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16};

int sum[4]={0};
int part=0;

void *sumOfArray(void * arg){
    int thread_part=part++;
    int i;

    for(i=thread_part * (MAX/4); i < (thread_part + 1) * (MAX /4); i++){
        sum[thread_part] += a[i];
    }
}

int main(){
    pthread_t threads[MTHREAD];
    int i;
    int total_sum=0;

    for(int i=0; i < MTHREAD; i++){
        pthread_create(&threads[i], NULL, sumOfArray, (void*) NULL);
    }
}
```

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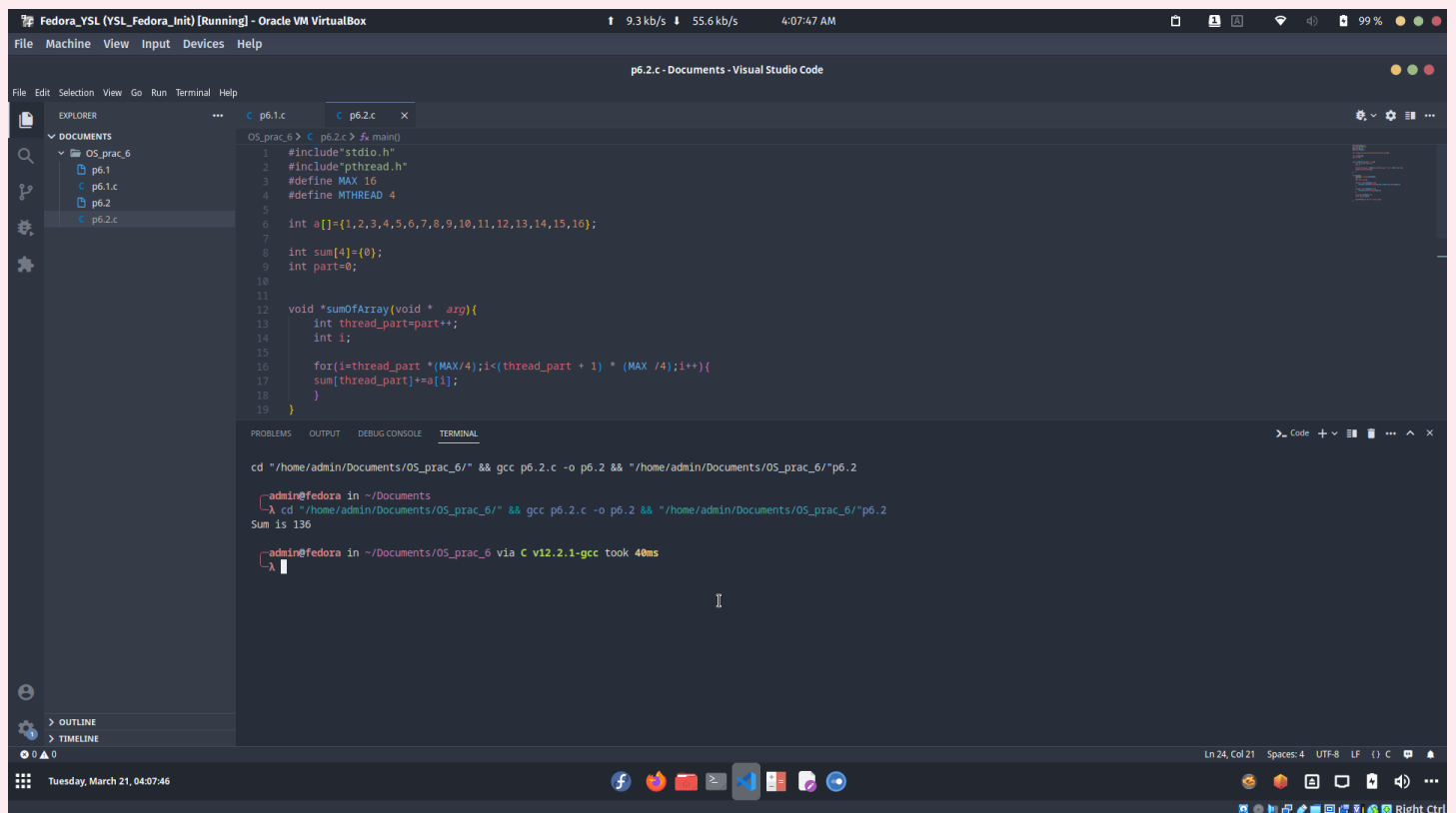
```
}

for(int i=0;i<MTHREAD;i++){
    pthread_join(threads[i],NULL);
}

for(i=0;i<MTHREAD;i++)
total_sum+=sum[i];

printf("Sum is %d \n" ,total_sum);
}
```

Output :



The screenshot shows a Visual Studio Code editor window titled "Fedora_YSL (YSL_Fedora_Init) [Running] - Oracle VM VirtualBox". The editor is open to a file named "p6.2.c" in the "DOCUMENTS" folder. The code in the editor is a C program that calculates the sum of an array using pthreads. The terminal output shows the compilation and execution of the program, resulting in the output "Sum is 136".

```
OS_prac_6 > cd p6.2.c && gcc p6.2.c -o p6.2 && ./p6.2
1 #include<stdio.h>
2 #include<pthread.h>
3 #define MAX 16
4 #define MTHREAD 4
5
6 int a[]={1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16};
7
8 int sum[4]={0};
9 int part=0;
10
11
12 void *sumOfArray(void * arg){
13     int thread_part=part++;
14     int i;
15
16     for(i=thread_part*(MAX/4);i<(thread_part + 1) * (MAX /4);i++){
17         sum[thread_part]+=a[i];
18     }
19 }
20
21 int main()
22 {
23     pthread_t threads[MTHREAD];
24     int i;
25
26     for(i=0;i<MTHREAD;i++){
27         pthread_create(&threads[i],NULL,sumOfArray,(void *)i);
28     }
29
30     for(i=0;i<MTHREAD;i++){
31         pthread_join(threads[i],NULL);
32     }
33
34     for(i=0;i<MTHREAD;i++)
35         total_sum+=sum[i];
36
37     printf("Sum is %d \n" ,total_sum);
38 }
39
40
```

```
cd "/home/admin/Documents/OS_prac_6/" && gcc p6.2.c -o p6.2 && "/home/admin/Documents/OS_prac_6/"p6.2
admin@fedora in ~/Documents
λ cd "/home/admin/Documents/OS_prac_6/" && gcc p6.2.c -o p6.2 && "/home/admin/Documents/OS_prac_6/"p6.2
Sum is 136
admin@fedora in ~/Documents/OS_prac_6 via C v12.2.1-gcc took 40ms
λ
```