EXPERIMENT- 8

REG- 16BIT0453
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Code:

```
#include<stdio.h>
#include<stdlib.h>

#define MAX_BLOCKS 10
#define MAX_FILES 20


const int hole_size = 1024;
int files[MAX_FILES];

void memory_status(const int blocks[],int blocks_num)
{
     int i;

     puts("Memory status: ");
     for(i=0;i<blocks_num;i++)
          printf("| %d ",blocks[i]);
     puts("|");
}


void first_fit(int blocks[],const int blocks_num,const int
files_num)
{
     int
i,j,allocated,unallocated[MAX_FILES],unalloc_count=0,ext_fragmenta
tion=0;

     for(i=0;i<files_num;i++)
     {
          allocated = 0;
          for(j=0;j<blocks_num;j++)
          {
               if(files[i] <= blocks[j])
               {
                    blocks[j] -= files[i];
                    allocated = 1;
                    printf("\nFile %d allocated in block
%d\n",i,j);
                    break;
               }
               else
```

```
                    continue;
          }
          if(allocated == 0)
          {
               printf("\nFile %d Cannot be allocated\n",i);
               unallocated[unalloc_count++] = files[i];
          }
     }
               memory_status(blocks,blocks_num);

     puts("External fragmentation");
     for(i=0;i<blocks_num;i++)
          ext_fragmentation += blocks[i];
     printf("%d\n",ext_fragmentation);
}

void best_fit(int blocks[],const int blocks_num,const int
files_num)
{
     int
i,j,allocated,unallocated[MAX_FILES],block_found,unalloc_count=0,e
xt_fragmentation=0;
     int best_index,block_file_diff;

     for(i=0;i<files_num;i++)
     {
          block_file_diff = 1024; //arbitrarily large number
assigned so that the first comparision in following loop becomes
true
          allocated = 0;
          block_found = 0;
          for(j=0;j<blocks_num;j++)
          {
               if(files[i] <= blocks[j])
               {
                    block_found = 1;
                    if(block_file_diff > (blocks[j]-files[i]))
                    {
                         block_file_diff = blocks[j] - files[i];
                         best_index = j;
                         continue;
                    }
               }
          }
          if(block_found == 0)
          {
               printf("\nFile %d cannot be allocated.\n",i);
               continue;
          }
          else
          {
               blocks[best_index] -= files[i];
```

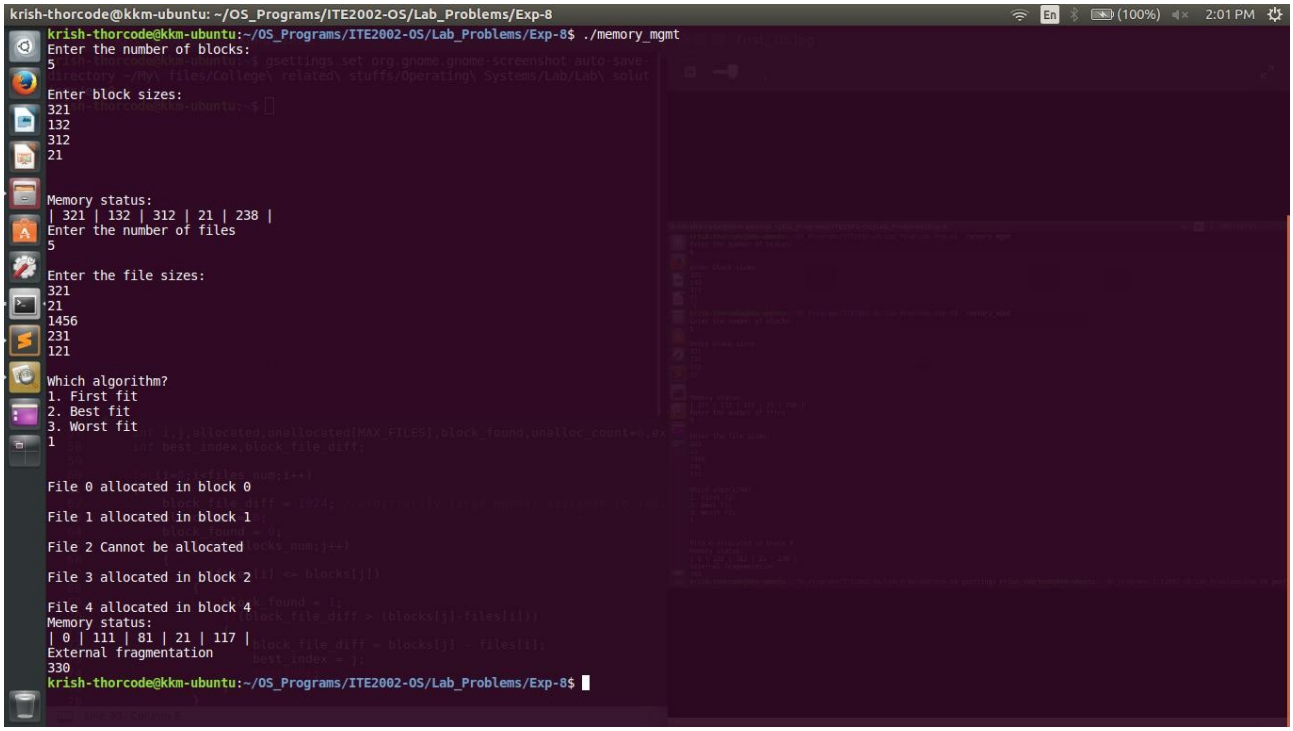
```
                allocated = 1;
                printf("\nFile %d allocated in block
%d\n",i,best_index);
          }

          memory_status(blocks,blocks_num);
     }

     puts("External fragmentation");
     for(i=0;i<blocks_num;i++)
          ext_fragmentation += blocks[i];
     printf("%d\n",ext_fragmentation);
}

void worst_fit(int blocks[],const int blocks_num,const int
files_num)
{
     int
i,j,allocated,unallocated[MAX_FILES],block_found,unalloc_count=0,e
xt_fragmentation=0;
     int worst_index,block_file_diff;

     for(i=0;i<files_num;i++)
     {
          block_file_diff = -1; //arbitrarily small number
assigned so that the first comparision in following loop becomes
true
          allocated = 0;
          block_found = 0;
          for(j=0;j<blocks_num;j++)
          {
               if(files[i] <= blocks[j])
               {
                    block_found = 1;
                    if(block_file_diff < (blocks[j]-files[i]))
                    {
                         block_file_diff = blocks[j] - files[i];
                         worst_index = j;
                         continue;
                    }
               }
          }
          if(block_found == 0)
          {
               printf("\nFile %d cannot be allocated.\n",i);
               continue;
          }
          else
          {
               blocks[worst_index] -= files[i];
               allocated = 1;
```

```
                printf("\nFile %d allocated in block
%d\n",i,worst_index);
          }

          memory_status(blocks,blocks_num);
     }

     puts("External fragmentation");
     for(i=0;i<blocks_num;i++)
          ext_fragmentation += blocks[i];
     printf("%d\n",ext_fragmentation);
}

int main(int argc,char *argv)
{
     int blocks[MAX_BLOCKS];
     int blocks_num,choice,blocks_sum=0,files_num,i;

     puts("Enter the number of blocks: ");
     scanf("%d",&blocks_num);
     puts("");

     puts("Enter block sizes:");
     for(i=0;i<blocks_num && blocks_sum <= hole_size;i++)
     {
          if(i == blocks_num-1)
          {
                blocks[i] = hole_size - blocks_sum; //fill the last
block automatically
                break;
          }

          scanf("%d",&blocks[i]);
          blocks_sum += blocks[i];
     }
     puts("");

     if(blocks_sum > hole_size)
     {
          printf("Hole size is only: %d\n",hole_size);
          exit(0);
     }
     puts("");

     memory_status(blocks,blocks_num);


     puts("Enter the number of files");
     scanf("%d",&files_num);
     puts("");

     puts("Enter the file sizes: ");
```

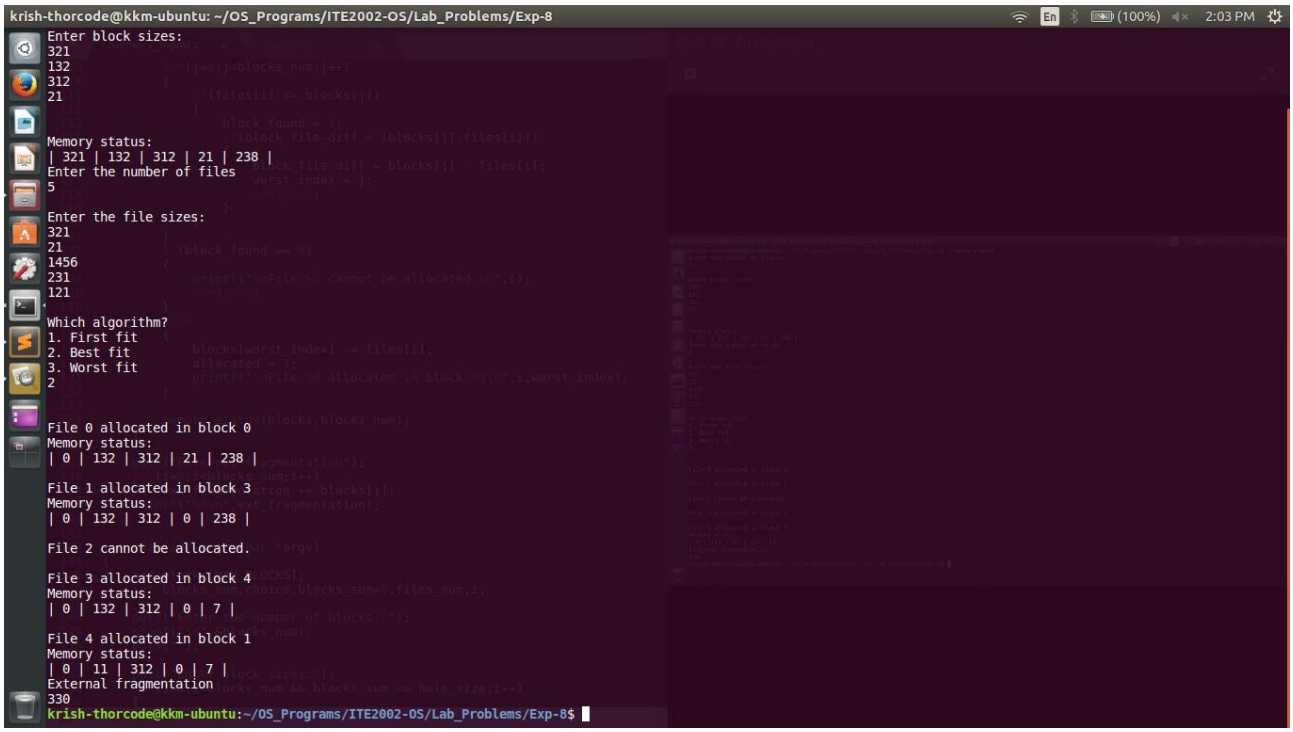
```
     for(i=0;i<files_num;i++)
          scanf("%d",&files[i]);
     puts("");

     puts("Which algorithm?\n1. First fit\n2. Best fit\n3. Worst
fit");
     scanf("%d",&choice);
     puts("");

     switch(choice)
     {
          case 1:
          first_fit(blocks,blocks_num,files_num);
          break;

          case 2:
          best_fit(blocks,blocks_num,files_num);
          break;

          case 3:
          worst_fit(blocks,blocks_num,files_num);
          break;
     }



     return 0;
}
```

OUTPUT:

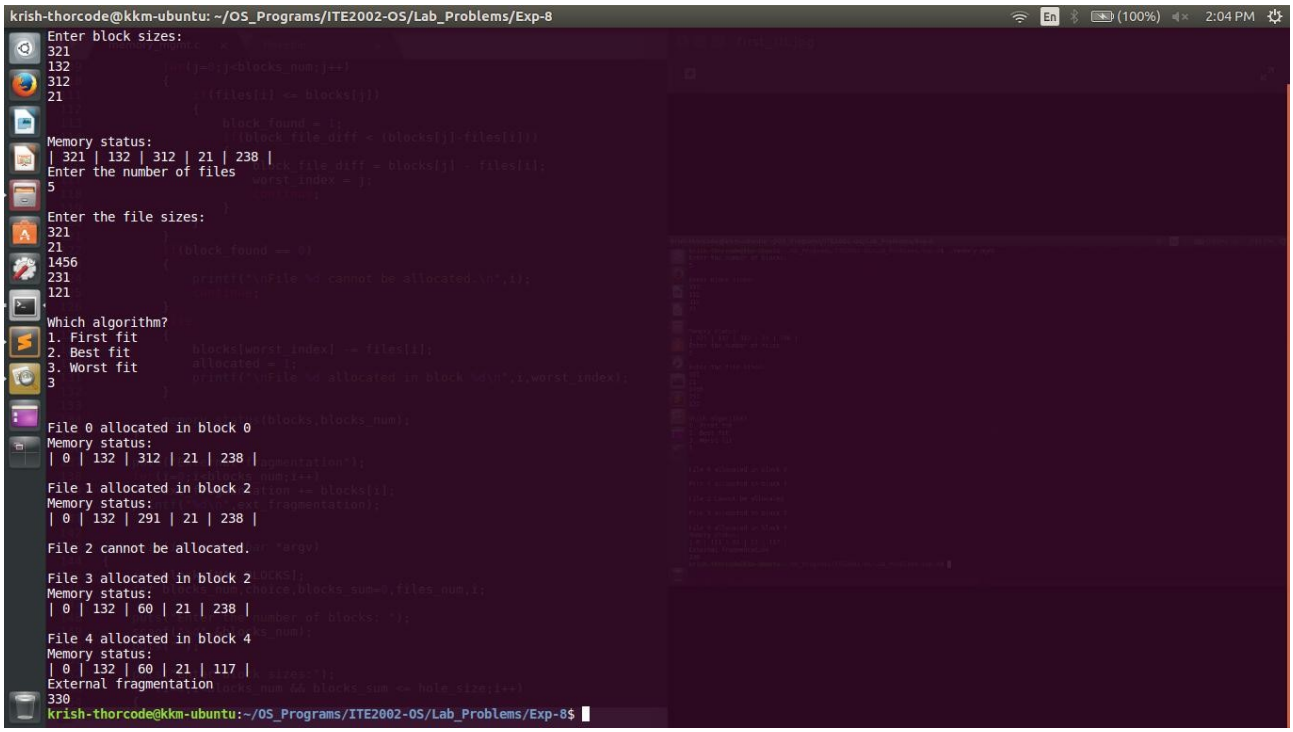
FIRST FIT:



BEST FIT:



WORST FIT:


krish-thorcode@kkm-ubuntu: ~/OS_Programs/ITE2002-OS/Lab_Problems/Exp-8
2:04 PM
Enter block sizes:
321
132
312
21
Memory status:
| 321 | 132 | 312 | 21 | 238 |
Enter the number of files
5
Enter the file sizes:
321
21
1456
231
121
Which algorithm?
1. First fit
2. Best fit
3. Worst fit
3
File 0 allocated in block 0
Memory status:
| 0 | 132 | 312 | 21 | 238 |
File 1 allocated in block 2
Memory status:
| 0 | 132 | 291 | 21 | 238 |
File 2 cannot be allocated.
File 3 allocated in block 2
Memory status:
| 0 | 132 | 60 | 21 | 238 |
File 4 allocated in block 4
Memory status:
| 0 | 132 | 60 | 21 | 117 |
External fragmentation
330
krish-thorcode@kkm-ubuntu:~/OS_Programs/ITE2002-OS/Lab_Problems/Exp-8$