C-PROGRAM FOR THE GIVEN SCENARIO ➔

```c
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <unistd.h>
#include <fcntl.h>
#include <sys/stat.h>
#include <sys/types.h>
char prod_name[100][100];
void printItems(int prod_num, int price, int quantity, float final_price, int i)
{  printf("%d\t\t%s\t\t\t\t%d\t  %d\t\t%f", prod_num, prod_name[i], price, quantity, final_price);}
int main()
{int product[100],price[100],c=0,quantity[10];
 float tax = 0,total=0,final_price[100];
 printf("----------------------------------------------------------------------\n");
 printf("\t\t\tWELCOME TO OUR SHOP\n");
 printf("----------------------------------------------------------------------\n");
 while (1)
 { printf("\nPLEASE SELECT ANY OF THE FOLLOWING CATAGORIES\n");
   printf("1. FRUITS AND VEGETABLES\n2. BEAUTY AND HYGIENE\n3. ELECTRONICS\n4. CLOTHES\n5. KITCHEN AND FURNITURE\n");
   int choice;
   scanf("%d", &choice);
   switch (choice)
   {case 1:
       printf("SELECT FROM THE BELOW LIST\n");
       char buffer1[1024], ch1;
       FILE *fp1;
       fp1 = fopen("fruits and vegetables.txt", "r");
       int rownum = 0, coloumnnum = 0;
       char prod_name1[30][30];
       while (fgets(buffer1, 1024, fp1))
       {   coloumnnum = 0;
           rownum++;
           char *field = strtok(buffer1, ",");
           while (field)
           {   if (coloumnnum == 1)
               { strcpy((char *)prod_name1[rownum], field); }
               field = strtok(NULL, ",");
               coloumnnum++;  }
           printf("%d. %s", rownum, prod_name1[rownum]);  }
       int price1[] = {100, 25, 50, 35, 25, 80, 90, 110, 55, 60};
       for (int i = 0; i < 100; i++)
       { //SELECTING PRODUCTS FROM THE LIST AND CALCULATING FINAL PRICE AFTER TAX
           printf("\nENTER THE PRODUCT NUMBER: ");
           scanf("%d", &product[c]);
           printf("\nENTER THE QUANTITY: ");
           scanf("%d", &quantity[c]);
           price[c] = price1[product[c] - 1];
           tax = tax + (((price1[product[c] - 1] * 0) / 100) * quantity[c]);
           final_price[c] = (((price1[product[c] - 1] * 0) / 100) + price1[product[c] - 1]) * quantity[c];
           total = total + final_price[c];
           strcpy((char *)prod_name[c], prod_name1[product[c]]);
           printf("\nPRESS 0 IF YOU ARE DONE SELECTING PRODUCT(S) ELSE PRESS ANY KEY TO CONTINUE: ");
           int d; c++; scanf("%d", &d);
           if (d == 0) break;}  break;
```

```c
case 2:
    printf("SELECT FROM THE BELOW LIST\n");
    char buffer2[1024], ch2;
    FILE *fp2;
    fp2 = fopen("beauty and hygiene.txt", "r");
    int rownum2 = 0, coloumnnum2 = 0;
    char prod_name2[30][30];
    while (fgets(buffer2, 1024, fp2))
    {   coloumnnum2 = 0;
        rownum2++;
        char *field = strtok(buffer2, ",");
        while (field)
        {   if (coloumnnum2 == 1)
            { strcpy((char *)prod_name2[rownum2], field); }
            field = strtok(NULL, ",");
            coloumnnum2++; }
        printf("%d. %s", rownum2, prod_name2[rownum2]); }
    int price2[] = {150, 250, 375, 135, 35, 500, 900, 100, 285, 335};
    for (int i = 0; i < 100; i++)
    { //SELECTING PRODUCTS FROM THE LIST AND CALCULATING FINAL PRICE AFTER TAX
        printf("\nENTER THE PRODUCT NUMBER: ");
        scanf("%d", &product[c]);
        printf("\nENTER THE QUANTITY: ");
        scanf("%d", &quantity[c]);
        price[c] = price2[product[c] - 1];
        tax = tax + (((price2[product[c] - 1] * 5) / 100) * quantity[c]);
        final_price[c] = (((price2[product[c] - 1] * 5) / 100) + price2[product[c] - 1]) * quantity[c];
        total = total + final_price[c];
        strcpy(prod_name[c], prod_name2[product[c]]);
        printf("\nPRESS 0 IF YOU ARE DONE SELECTING PRODUCT(S) ELSE PRESS ANY KEY TO CONTINUE: ");
        int d;c++; scanf("%d", &d);
        if (d == 0)  break; }  break;
case 3:
    printf("SELECT FROM THE BELOW LIST\n");
    char buffer3[1024], ch3;
    FILE *fp3;
    fp3 = fopen("electronics.txt", "r");
    int rownum3 = 0, coloumnnum3 = 0;
    char prod_name3[30][30];
    while (fgets(buffer3, 1024, fp3))
    {   coloumnnum3 = 0;
        rownum3++;
        char *field = strtok(buffer3, ",");
        while (field)
        {   if (coloumnnum3 == 1)
            {strcpy((char *)prod_name3[rownum3], field); }
            field = strtok(NULL, ",");
            coloumnnum3++; }
        printf("%d. %s", rownum3, prod_name3[rownum3]);}
    int price3[] = {15000, 25550, 10000, 800, 50000, 6000, 250, 20000, 500, 800};
    for (int i = 0; i < 100; i++)
    { //SELECTING PRODUCTS FROM THE LIST AND CALCULATING FINAL PRICE AFTER TAX
        printf("\nENTER THE PRODUCT NUMBER: ");
        scanf("%d", &product[c]);
        printf("\nENTER THE QUANTITY: ");
        scanf("%d", &quantity[c]);
        price[c] = price3[product[c] - 1];
        tax = tax + (((price3[product[c] - 1] * 28) / 100) * quantity[c]);
        final_price[c] = (((price3[product[c] - 1] * 28) / 100) + price3[product[c] - 1]) * quantity[c];
        total = total + final_price[c];
        strcpy(prod_name[c], prod_name3[product[c]]);
        printf("\nPRESS 0 IF YOU ARE DONE SELECTING PRODUCT(S) ELSE PRESS ANY KEY TO CONTINUE: ");
        int d; c++; scanf("%d", &d);
        if (d == 0) break; }  break;
```

```c
case 4:
    printf("SELECT FROM THE BELOW LIST\n");
    char buffer4[1024], ch4;
    FILE *fp4;
    fp4 = fopen("clothes.txt", "r");
    int rownum4 = 0, coloumnnum4 = 0;
    char prod_name4[30][30];
    while (fgets(buffer4, 1024, fp4))
    {   coloumnnum4 = 0;
        rownum4++;
        char *field = strtok(buffer4, ",");
        while (field)
        {   if (coloumnnum4 == 1)
            { strcpy((char *)prod_name4[rownum4], field); }
            field = strtok(NULL, ",");
            coloumnnum4++;}
        printf("%d. %s", rownum4, prod_name4[rownum4]);}
    int price4[] = {1000, 600, 500, 800, 1500, 100, 300, 80, 300, 950};
    for (int i = 0; i < 100; i++)
    { //SELECTING PRODUCTS FROM THE LIST AND CALCULATING FINAL PRICE AFTER TAX
        printf("\nENTER THE PRODUCT NUMBER: ");
        scanf("%d", &product[c]);
        printf("\nENTER THE QUANTITY: ");
        scanf("%d", &quantity[c]);
        price[c] = price4[product[c] - 1];
        tax = tax + (((price4[product[c] - 1] * 12) / 100) * quantity[c]);
        final_price[c] = (((price4[product[c] - 1] * 12) / 100) + price4[product[c] - 1]) * quantity[c];
        total = total + final_price[c];
        strcpy(prod_name[c], prod_name4[product[c]]);
        printf("\nPRESS 0 IF YOU ARE DONE SELECTING PRODUCT(S) ELSE PRESS ANY KEY TO CONTINUE: ");
        int d;c++;scanf("%d", &d);
        if (d == 0) break;} break;
case 5:
    printf("SELECT FROM THE BELOW LIST\n");
    char buffer5[1024], ch5;
    FILE *fp5;
    fp5 = fopen("kitchen and furniture.txt", "r");
    int rownum5 = 0, coloumnnum5 = 0;
    char prod_name5[30][30];
    while (fgets(buffer5, 1024, fp5))
    {   coloumnnum5 = 0;
        rownum5++;
        char *field = strtok(buffer5, ",");
        while (field)
        {   if (coloumnnum5 == 1)
            { strcpy((char *)prod_name5[rownum5], field); }
            field = strtok(NULL, ",");
            coloumnnum5++; }
        printf("%d. %s", rownum5, prod_name5[rownum5]); }
    int price5[] = {150, 100, 1375, 535, 30000, 5000, 10000, 50, 1500, 800};
    for (int i = 0; i < 100; i++)
    { //SELECTING PRODUCTS FROM THE LIST AND CALCULATING FINAL PRICE AFTER TAX
        printf("\nENTER THE PRODUCT NUMBER: ");
        scanf("%d", &product[c]);
        printf("\nENTER THE QUANTITY: ");
        scanf("%d", &quantity[c]);
        price[c] = price5[product[c] - 1];
        tax = tax + (((price5[product[c] - 1] * 18) / 100) * quantity[c]);
        final_price[c] = (((price5[product[c] - 1] * 18) / 100) + price5[product[c] - 1]) * quantity[c];
        total = total + final_price[c];
        strcpy(prod_name[c], prod_name5[product[c]]);
        printf("\nPRESS 0 IF YOU ARE DONE SELECTING PRODUCT(S) ELSE PRESS ANY KEY TO CONTINUE: ");
        int d;c++; scanf("%d", &d);
        if (d == 0) break; } break;
```

```c
default:
printf("\nINVALID CHOICE PLEASE TRY AGAIN!!");   }
printf("\nPRESS 1 IF YOU WISH TO CONTINUE ELSE PRESS 0: ");
int d; scanf("%d", &d);
if (d == 0) break; }
printf("\n-------------------------------------------------------------------------");
printf("\nPRODUCT NUMBER\tPRODUCT NAME\tPRICE\tQUANTITY\tFINAL PRICE");
printf("\n-------------------------------------------------------------------------\n");
for (int i = 0; i < c; i++)
{   printItems(product[i], price[i], quantity[i], final_price[i], i );
    printf("\n"); }
printf("\n-------------------------------------------------------------------------");
printf("\nTOTAL NUMBER OF PRODUCT PURCHASED: %d", c);
printf("\nTOTAL TAX APPLIED ON YOUR PRODUCTS IS: %f", tax);
printf("\nTOTAL AMOUNT TO BE PAID: %f", total);
printf("THANK YOU FOR SHOPPING WITH US :)");
return 0;}
```

OUTPUT OF THE PROGRAM IMPLEMENTED USING C- LANGUAGE ➔

```
PS F:\Study Material\College Materials\Sem 5\Assignments\PLP> gcc main.c
PS F:\Study Material\College Materials\Sem 5\Assignments\PLP> ./a
------------------------------------------------------------------------
                        WELCOME TO OUR SHOP
------------------------------------------------------------------------

PLEASE SELECT ANY OF THE FOLLOWING CATAGORIES
1. FRUITS AND VEGETABLES
2. BEAUTY AND HYGIENE
3. ELECTRONICS
4. CLOTHES
5. KITCHEN AND FURNITURE
1
SELECT FROM THE BELOW LIST
1. Brocolli
2. Cabbage
3. Onion
4. Potato
5. Tomato
6. Oranges
7. Banana
8. Apple
9. Watermelon
10. Avacado
ENTER THE PRODUCT NUMBER: 2

ENTER THE QUANTITY: 3

PRESS 0 IF YOU ARE DONE SELECTING PRODUCT(S) ELSE PRESS ANY KEY TO CONTINUE: 0

PRESS 1 IF YOU WISH TO CONTINUE ELSE PRESS 0: 1

PLEASE SELECT ANY OF THE FOLLOWING CATAGORIES
1. FRUITS AND VEGETABLES
2. BEAUTY AND HYGIENE
3. ELECTRONICS
4. CLOTHES
5. KITCHEN AND FURNITURE
```

2
SELECT FROM THE BELOW LIST
1. Lipstick
2. AXE Deo
3. Body Lotion
4. Handwash
5. Cinthol Soap
6. Eyelashes
7. Hair Oil
8. Room Freshner
9. Face Wash
10. Vaseline
ENTER THE PRODUCT NUMBER: 7

ENTER THE QUANTITY: 2

PRESS 0 IF YOU ARE DONE SELECTING PRODUCT(S) ELSE PRESS ANY KEY TO CONTINUE: 0

PRESS 1 IF YOU WISH TO CONTINUE ELSE PRESS 0: 1

PLEASE SELECT ANY OF THE FOLLOWING CATAGORIES
1. FRUITS AND VEGETABLES
2. BEAUTY AND HYGIENE
3. ELECTRONICS
4. CLOTHES
5. KITCHEN AND FURNITURE
3
SELECT FROM THE BELOW LIST
1. Television
2. Camera
3. Mobile
4. Earphone
5. Laptop
6. Monitor
7. Charger
8. Washing Machine
9. Headphone
10. Fan

```
ENTER THE PRODUCT NUMBER: 5

ENTER THE QUANTITY: 2

PRESS 0 IF YOU ARE DONE SELECTING PRODUCT(S) ELSE PRESS ANY KEY TO CONTINUE: 0

PRESS 1 IF YOU WISH TO CONTINUE ELSE PRESS 0: 1

PLEASE SELECT ANY OF THE FOLLOWING CATAGORIES
1. FRUITS AND VEGETABLES
2. BEAUTY AND HYGIENE
3. ELECTRONICS
4. CLOTHES
5. KITCHEN AND FURNITURE
4
SELECT FROM THE BELOW LIST
1. Shirt
2. T-Shirt
3. Formal Pants
4. Jeans
5. Jacket
6. Underwear
7. Bra
8. Innerwear
9. Sweatshirt
10. Trousers
ENTER THE PRODUCT NUMBER: 5

ENTER THE QUANTITY: 2

PRESS 0 IF YOU ARE DONE SELECTING PRODUCT(S) ELSE PRESS ANY KEY TO CONTINUE: 0

PRESS 1 IF YOU WISH TO CONTINUE ELSE PRESS 0: 1


PLEASE SELECT ANY OF THE FOLLOWING CATAGORIES
1. FRUITS AND VEGETABLES
2. BEAUTY AND HYGIENE
3. ELECTRONICS
4. CLOTHES
5. KITCHEN AND FURNITURE
5
SELECT FROM THE BELOW LIST
1. Knife
2. Chopping Board
3. Pan
4. Cooker
5. Dinning Table
6. Chairs
7. Sofa
8. Scissors
9. Study Table
10. Wall Clock
ENTER THE PRODUCT NUMBER: 4

ENTER THE QUANTITY: 3

PRESS 0 IF YOU ARE DONE SELECTING PRODUCT(S) ELSE PRESS ANY KEY TO CONTINUE: 0

PRESS 1 IF YOU WISH TO CONTINUE ELSE PRESS 0: 0
```
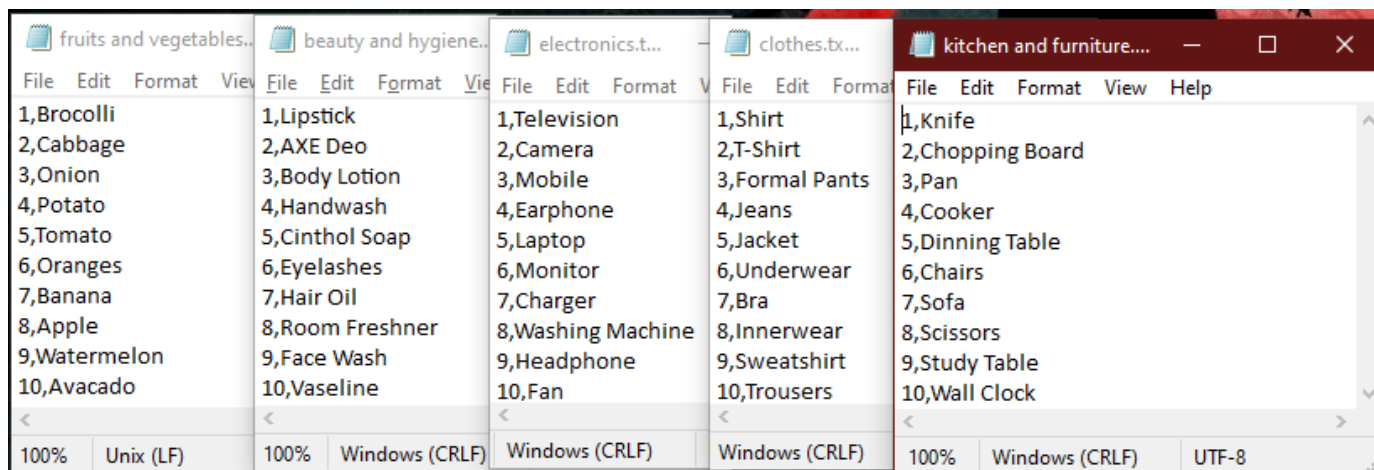
```
------------------------------------------------------------------------
PRODUCT NUMBER   PRODUCT NAME     PRICE    QUANTITY         FINAL PRICE
------------------------------------------------------------------------
2                Cabbage
                                  25       3                75.000000
7                Hair Oil
                                  900      2                1890.000000
5                Laptop
                                  50000    2                128000.000000
5                Jacket
                                  1500     2                3360.000000
4                Cooker
                                  535      3                1893.000000


------------------------------------------------------------------------
TOTAL NUMBER OF PRODUCT PURCHASED: 5
TOTAL TAX APPLIED ON YOUR PRODUCTS IS: 28738.000000
TOTAL AMOUNT TO BE PAID: 135218.000000
THANK YOU FOR SHOPPING WITH US :)
```

5 Files with different category with their distinct products used is C programming ➔

fruits and vegetables..	beauty and hygiene..	electronics.t...	clothes.tx...	kitchen and furniture....
File Edit Format View	File Edit Format View	File Edit Format V	File Edit Format	File Edit Format View Help
1,Brocolli	1,Lipstick	1,Television	1,Shirt	1,Knife
2,Cabbage	2,AXE Deo	2,Camera	2,T-Shirt	2,Chopping Board
3,Onion	3,Body Lotion	3,Mobile	3,Formal Pants	3,Pan
4,Potato	4,Handwash	4,Earphone	4,Jeans	4,Cooker
5,Tomato	5,Cinthol Soap	5,Laptop	5,Jacket	5,Dinning Table
6,Oranges	6,Eyelashes	6,Monitor	6,Underwear	6,Chairs
7,Banana	7,Hair Oil	7,Charger	7,Bra	7,Sofa
8,Apple	8,Room Freshner	8,Washing Machine	8,Innerwear	8,Scissors
9,Watermelon	9,Face Wash	9,Headphone	9,Sweatshirt	9,Study Table
10,Avacado	10,Vaseline	10,Fan	10,Trousers	10,Wall Clock
100% Unix (LF)	100% Windows (CRLF)	Windows (CRLF)	Windows (CRLF)	100% Windows (CRLF) UTF-8

JAVA-PROGRAM FOR THE GIVEN SCENARIO ➔

a) **Main billing class in which all the items in the shop are being read from a file and then displayed and selected by user depending on their choice of category and then for printing subclass is being called i.e. printItems class :-**

```java
import java.io.*;
import java.util.*;
public class Billing {
    public static void main(String args[]) throws IOException {
    Scanner sc = new Scanner(System.in);
        int product[] = new int[100];int price[]=new int[100];
        int quantity[] = new int[100]; String arr[]=new String[100];
        float final_price[] = new float[100];
        int c = 0;float total=0,tax=0;
        System.out.println("-----------------------------------------------------------------");
        System.out.println("\t\t\t\tWELCOME TO OUR SHOP");
        System.out.println("-----------------------------------------------------------------");
    while (true) {
      System.out.println("PLEASE SELECT ANY OF THE FOLLOWING CATAGORIES");
System.out.println("1. FRUITS AND VEGETABLES\n2. BEAUTY AND HYGIENE\n3. ELECTRONICS\n4. CLOTHES\n5. KITCHEN AND FURNITURE");
            int choice = sc.nextInt();
          switch (choice) {
            case 1:
                BufferedReader in1 = new BufferedReader(new FileReader( fileName: "fruits and vegetables.txt"));
                String str1;
                List<String> output = new LinkedList<String>();
                while((str1= in1.readLine()) != null){
                    output.add(str1);    }
                String[] arr1 = output.toArray(new String[output.size()]);
                System.out.println("SELECT PRODUCT(S) FROM THE LIST BELOW");
                for(int i=0;i<10;i++)
                    System.out.println(arr1[i]);
                int price1[] = {100, 25, 50, 35, 25, 80, 90, 110, 55, 60};
                while(true) {//SELECTING PRODUCTS FROM THE LIST AND CALCULATING FINAL PRICE AFTER TAX
                    System.out.print("ENTER THE PRODUCT NUMBER: ");
                    product[c] = sc.nextInt();
                    System.out.print("\nENTER THE QUANTITY: ");
                    quantity[c] = sc.nextInt();
                    price[c]=price1[product[c]-1];
                    tax=tax+(((price1[product[c]-1] * 0) / 100)* quantity[c]);
                    final_price[c] = (((price1[product[c]-1] * 0) / 100) + price1[product[c]-1]) * quantity[c];
                    total=total+final_price[c];
                    arr[c]=arr1[product[c]-1];c++;
            System.out.print("\nPRESS 0 IF YOU ARE DONE SELECTING PRODUCT(S) ELSE PRESS ANY KEY TO CONTINUE: ");
                    if (sc.nextInt() == 0) break;    }
                break;
```

```java
case 2:
    BufferedReader in2 = new BufferedReader(new FileReader( fileName: "beauty and hygiene.txt"));
    String str2;
    List<String> out = new LinkedList<String>();
    while((str2= in2.readLine()) != null){
        out.add(str2); }
    String[] arr2 = out.toArray(new String[out.size()]);
    System.out.println("SELECT PRODUCT(S) FROM THE LIST BELOW");
    for(int i=0;i<10;i++)
        System.out.println(arr2[i]);
    int price2[] = {150, 250, 375, 135, 35, 500, 900, 100, 285, 335};
    while(true) {//SELECTING PRODUCTS FROM THE LIST AND CALCULATING FINAL PRICE AFTER TAX
        System.out.print("ENTER THE PRODUCT NUMBER: ");
        product[c] = sc.nextInt();
        System.out.print("\nENTER THE QUANTITY: ");
        quantity[c] = sc.nextInt();
        price[c]=price2[product[c]-1];
        tax=tax+(((price2[product[c]-1] * 5) / 100)* quantity[c]);
        final_price[c] = (((price2[product[c]-1] * 5) / 100) + price2[product[c]-1]) * quantity[c];
        total=total+final_price[c];
        arr[c]=arr2[product[c]-1];c++;
System.out.print("\nPRESS 0 IF YOU ARE DONE SELECTING PRODUCT(S) ELSE PRESS ANY KEY TO CONTINUE: ");
        if (sc.nextInt() == 0) break;    }
    break;

case 3:
    BufferedReader in3 = new BufferedReader(new FileReader( fileName: "electronics.txt"));
    String str3;
    List<String> o = new LinkedList<String>();
    while((str3= in3.readLine()) != null){
        o.add(str3);   }
    String[] arr3 = o.toArray(new String[o.size()]);
    System.out.println("SELECT PRODUCT(S) FROM THE LIST BELOW");
    for(int i=0;i<10;i++)
        System.out.println(arr3[i]);
    int price3[] = {15000, 25550, 10000, 800, 50000, 6000, 250, 20000, 500, 800};
    while(true) {//SELECTING PRODUCTS FROM THE LIST AND CALCULATING FINAL PRICE AFTER TAX
        System.out.print("ENTER THE PRODUCT NUMBER: ");
        product[c] = sc.nextInt();
        System.out.print("\nENTER THE QUANTITY: ");
        quantity[c] = sc.nextInt();
        price[c]=price3[product[c]-1];
        tax=tax+(((price3[product[c]-1] * 28) / 100)* quantity[c]);
        final_price[c] = (((price3[product[c]-1] * 28) / 100) + price3[product[c]-1]) * quantity[c];
        total=total+final_price[c];
        arr[c]=arr3[product[c]-1];c++;
System.out.print("\nPRESS 0 IF YOU ARE DONE SELECTING PRODUCT(S) ELSE PRESS ANY KEY TO CONTINUE: ");
        if (sc.nextInt() == 0) break;   }
    break;
```

```java
case 4:
    BufferedReader in4 = new BufferedReader(new FileReader( fileName: "clothes.txt"));
    String str4;
    List<String> o4 = new LinkedList<String>();
    while((str4= in4.readLine()) != null){
        o4.add(str4);   }
    String[] arr4 = o4.toArray(new String[o4.size()]);
    System.out.println("SELECT PRODUCT(S) FROM THE LIST BELOW");
    for(int i=0;i<10;i++)
        System.out.println(arr4[i]);
    int price4[] = {1000, 600, 500, 800, 1500, 100, 300, 80, 300, 950};
    while(true) {//SELECTING PRODUCTS FROM THE LIST AND CALCULATING FINAL PRICE AFTER TAX
        System.out.print("ENTER THE PRODUCT NUMBER: ");
        product[c] = sc.nextInt();
        System.out.print("\nENTER THE QUANTITY: ");
        quantity[c] = sc.nextInt();
        price[c]=price4[product[c]-1];
        tax=tax+(((price4[product[c]-1] * 12) / 100)* quantity[c]);
        final_price[c] = (((price4[product[c]-1] * 12) / 100) + price4[product[c]-1]) * quantity[c];
        total=total+final_price[c];
        arr[c]=arr4[product[c]-1];c++;
System.out.print("\nPRESS 0 IF YOU ARE DONE SELECTING PRODUCT(S) ELSE PRESS ANY KEY TO CONTINUE: ");
        if (sc.nextInt() == 0) break; }
    break;

case 5:
    BufferedReader in5 = new BufferedReader(new FileReader( fileName: "kitchen and furniture.txt"));
    String str5;
    List<String> o5 = new LinkedList<String>();
    while((str5= in5.readLine()) != null){
        o5.add(str5);   }
    String[] arr5 = o5.toArray(new String[o5.size()]);
    System.out.println("SELECT PRODUCT(S) FROM THE LIST BELOW");
    for(int i=0;i<10;i++)
        System.out.println(arr5[i]);
    int price5[] = {150, 100, 1375, 535, 30000, 5000, 10000, 50, 1500, 800};
    while(true) {//SELECTING PRODUCTS FROM THE LIST AND CALCULATING FINAL PRICE AFTER TAX
        System.out.print("ENTER THE PRODUCT NUMBER: ");
        product[c] = sc.nextInt();
        System.out.print("\nENTER THE QUANTITY: ");
        quantity[c] = sc.nextInt();
        price[c]=price5[product[c]-1];
        tax=tax+(((price5[product[c]-1] * 18) / 100)* quantity[c]);
        final_price[c] = (((price5[product[c]-1] * 18) / 100) + price5[product[c]-1]) * quantity[c];
        total=total+final_price[c];
        arr[c]=arr5[product[c]-1];c++;
System.out.print("\nPRESS 0 IF YOU ARE DONE SELECTING PRODUCT(S) ELSE PRESS ANY KEY TO CONTINUE: ");
        if (sc.nextInt() == 0) break;  }
    break;
```

```java
        default:
            System.out.println("\nINVALID CHOICE PLEASE TRY AGAIN!!");  }
    System.out.print("\nPRESS 1 IF YOU WISH TO CONTINUE ELSE PRESS 0: ");
    if(sc.nextInt()==0) break; }
System.out.println("----------------------------------------------------------------------------");
System.out.println("PRODUCT NUMBER\tPRODUCT NAME\tPRICE\tQUANTITY\tFINAL PRICE");
System.out.println("----------------------------------------------------------------------------");
for (int i = 0; i < c; i++)
{   printItems obj=new printItems(arr[i],product[i],price[i], quantity[i], final_price[i]); }
System.out.println("----------------------------------------------------------------------------");
System.out.println("TOTAL NUMBER OF PRODUCT PURCHASED: "+c);
System.out.println("TOTAL AMOUNT OF TAX TO BE PAID IS: "+tax);
System.out.println("TOTAL AMOUNT TO BE PAID: "+total);  }}
```

b) data class containing getter and setter methods :-

```java
public class data {
    private String prod_name;
    private int prod_num;
    private int price;
    private int quantity;
    private float final_price;
    public String getProd_name() {
        return prod_name;    }
    public void setProd_name(String prod_name) {
        this.prod_name = prod_name;    }
    public int getProd_num() {
        return prod_num;    }
    public void setProd_num(int prod_num) {
        this.prod_num = prod_num;    }
    public int getPrice() {
        return price;    }
    public void setPrice(int price) {
        this.price = price;    }
    public int getQuantity() {
        return quantity;    }
    public void setQuantity(int quantity) {
        this.quantity = quantity;    }
    public float getFinal_price() {
        return final_price;    }
    public void setFinal_price(float final_price) {
        this.final_price = final_price;    }
    public data(String prod_name, int prod_num, int price, int quantity, float final_price) {
        this.prod_name = prod_name;
        this.prod_num = prod_num;
        this.price = price;
        this.quantity = quantity;
        this.final_price = final_price;    }}
```

c) printItems class containing all the details from its parent class i.e data and using getter and setter methods data is been taken and then bill is getting printed :-

```java
public class printItems extends data {
    public printItems(String prod_name, int prod_num, int price, int quantity, float final_price) {
        super(prod_name, prod_num, price, quantity, final_price);
        if(prod_num<10)
System.out.println("\t"+prod_num+"\t\t\t"+prod_name.substring(3)+"\t\t\t"+price+"\t\t\t"+quantity+"\t\t"+final_price);
        else
System.out.println("\t"+prod_num+"\t\t\t"+prod_name.substring(4)+"\t\t\t"+price+"\t\t\t"+quantity+"\t\t\t"+final_price);
    }}
```

OUTPUT FOR PROGRAM IMPLEMENTED USING JAVA- LANGUAGE ➔

```
"C:\Program Files\Java\jdk1.8.0_181\bin\java.exe" ...
-------------------------------------------------------------------
                 WELCOME TO OUR SHOP
-------------------------------------------------------------------
PLEASE SELECT ANY OF THE FOLLOWING CATAGORIES
1. FRUITS AND VEGETABLES
2. BEAUTY AND HYGIENE
3. ELECTRONICS
4. CLOTHES
5. KITCHEN AND FURNITURE
1
SELECT PRODUCT(S) FROM THE LIST BELOW
1. Brocolli
2. Cabbage
3. Onion
4. Potato
5. Tomato
6. Oranges
7. Banana
8. Apple
9. Watermelon
10. Avacado
ENTER THE PRODUCT NUMBER: 3

ENTER THE QUANTITY: 2

PRESS 0 IF YOU ARE DONE SELECTING PRODUCT(S) ELSE PRESS ANY KEY TO CONTINUE: 0

PRESS 1 IF YOU WISH TO CONTINUE ELSE PRESS 0: 1
PLEASE SELECT ANY OF THE FOLLOWING CATAGORIES
1. FRUITS AND VEGETABLES
2. BEAUTY AND HYGIENE
3. ELECTRONICS
4. CLOTHES
5. KITCHEN AND FURNITURE
2
SELECT PRODUCT(S) FROM THE LIST BELOW
1. Lipstick
2. AXE Deo
3. Body Lotion
4. Handwash
5. Soap
6. Eyelashes
7. Hair Oil
8. Room Freshner
9. Face Wash
10. Vaseline
ENTER THE PRODUCT NUMBER: 5

ENTER THE QUANTITY: 5

PRESS 0 IF YOU ARE DONE SELECTING PRODUCT(S) ELSE PRESS ANY KEY TO CONTINUE: 0

PRESS 1 IF YOU WISH TO CONTINUE ELSE PRESS 0: 1
PLEASE SELECT ANY OF THE FOLLOWING CATAGORIES
1. FRUITS AND VEGETABLES
2. BEAUTY AND HYGIENE
3. ELECTRONICS
4. CLOTHES
5. KITCHEN AND FURNITURE
3
SELECT PRODUCT(S) FROM THE LIST BELOW
1. Television
2. Camera
3. Mobile
4. Earphone
5. Laptop
6. Monitor
7. Charger
8. Washing Machine
```

```
9. Headphone
10. Fan
ENTER THE PRODUCT NUMBER: 7

ENTER THE QUANTITY: 2

PRESS 0 IF YOU ARE DONE SELECTING PRODUCT(S) ELSE PRESS ANY KEY TO CONTINUE: 0

PRESS 1 IF YOU WISH TO CONTINUE ELSE PRESS 0: 1
PLEASE SELECT ANY OF THE FOLLOWING CATAGORIES
1. FRUITS AND VEGETABLES
2. BEAUTY AND HYGIENE
3. ELECTRONICS
4. CLOTHES
5. KITCHEN AND FURNITURE
4
SELECT PRODUCT(S) FROM THE LIST BELOW
1. Shirt
2. T-Shirt
3. Formal Pants
4. Jeans
5. Jacket
6. Underwear
7. Bra
8. Innerwear
9. Sweatshirt
10. Trousers
ENTER THE PRODUCT NUMBER: 4

ENTER THE QUANTITY: 3

PRESS 0 IF YOU ARE DONE SELECTING PRODUCT(S) ELSE PRESS ANY KEY TO CONTINUE: 0
PRESS 1 IF YOU WISH TO CONTINUE ELSE PRESS 0: 1
PLEASE SELECT ANY OF THE FOLLOWING CATAGORIES
1. FRUITS AND VEGETABLES
2. BEAUTY AND HYGIENE
3. ELECTRONICS
4. CLOTHES
5. KITCHEN AND FURNITURE
5
SELECT PRODUCT(S) FROM THE LIST BELOW
1. Knife
2. Chopping Board
3. Pan
4. Cooker
5. Dinning Table
6. Chairs
7. Sofa
8. Scissors
9. Study Table
10. Wall Clock
ENTER THE PRODUCT NUMBER: 4

ENTER THE QUANTITY: 2

PRESS 0 IF YOU ARE DONE SELECTING PRODUCT(S) ELSE PRESS ANY KEY TO CONTINUE: 0

PRESS 1 IF YOU WISH TO CONTINUE ELSE PRESS 0: 0
```
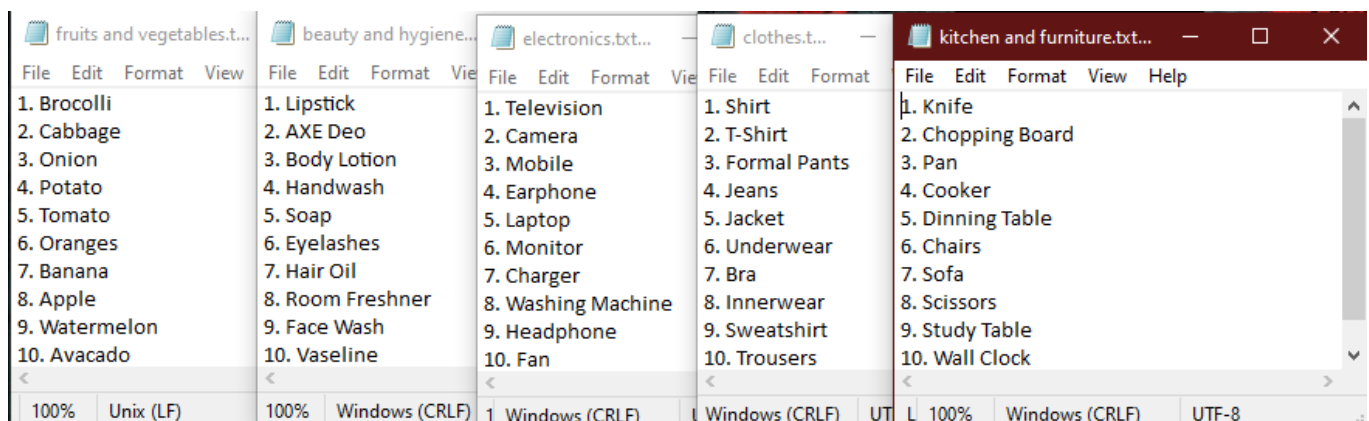
```
-----------------------------------------------------------------------
PRODUCT NUMBER   PRODUCT NAME     PRICE    QUANTITY    FINAL PRICE
-----------------------------------------------------------------------
     3              Onion           50         2          100.0
     5              Soap            35         5          180.0
     7              Charger         250        2          640.0
     4              Jeans           800        3          2688.0
     4              Cooker          535        2          1262.0
-----------------------------------------------------------------------

TOTAL NUMBER OF PRODUCT PURCHASED: 5
TOTAL AMOUNT OF TAX TO BE PAID IS: 625.0
TOTAL AMOUNT TO BE PAID: 4870.0

Process finished with exit code 0
```

5 Files with different category with their distinct products used is JAVA programming ➜

fruits and vegetables.t...	beauty and hygiene...	electronics.txt...	clothes.t...	kitchen and furniture.txt...
File Edit Format View	File Edit Format Vie	File Edit Format Vie	File Edit Format	File Edit Format View Help
1. Brocolli	1. Lipstick	1. Television	1. Shirt	1. Knife
2. Cabbage	2. AXE Deo	2. Camera	2. T-Shirt	2. Chopping Board
3. Onion	3. Body Lotion	3. Mobile	3. Formal Pants	3. Pan
4. Potato	4. Handwash	4. Earphone	4. Jeans	4. Cooker
5. Tomato	5. Soap	5. Laptop	5. Jacket	5. Dinning Table
6. Oranges	6. Eyelashes	6. Monitor	6. Underwear	6. Chairs
7. Banana	7. Hair Oil	7. Charger	7. Bra	7. Sofa
8. Apple	8. Room Freshner	8. Washing Machine	8. Innerwear	8. Scissors
9. Watermelon	9. Face Wash	9. Headphone	9. Sweatshirt	9. Study Table
10. Avacado	10. Vaseline	10. Fan	10. Trousers	10. Wall Clock
100% Unix (LF)	100% Windows (CRLF)	1 Windows (CRLF)	Windows (CRLF) UT	L 100% Windows (CRLF) UTF-8

Comparison of java and C with respect to ease of writing:-

If we discuss on the ease of writing program then I will say that java is easy as compared to C language. In the scenario we were asked to develop a program for a billing system according to tax slots given and the tax slots can be divided depending on the seller. The program has to be generic which means that there can be any number of customers and many number of products in a shop due to which we will have large number of data that needs to be stored. For that if we can use database, files, array, gson, etc depending on what programmer feels easy. Here I have used files and array. File handling in java is much easier than file handling in C. In java, there are many methods using which we can handle file very easy whereas C doesn't provide those features. For example in java I read file and line by line stored it in an array and then later after selecting products I was able to print the name of the product without any whitespaces or number using substring but in C when I wanted to do the same thing I wasn't able to do because C cannot read files and store it in an array as easily as compared to java. In C using file pointer, each file separated by comma has been taken and in the loop each character is read and as the comma is read, the characters after

that is getting stored in a character array. This is a very complex way of handling file. It effects readability, writability, complexity and effectiveness of a program. Anyone reading C file will get confused because what java can do in one line C has to do in many lines of codes. Its like decoding java methods.

As per the scenario and after understanding the difficulties in both the programming language, I prefer java over C to deal with this type of problem with large number of data. Printing product name was the most difficult part which I came across with. Java has exceptional handling features. For example if a file is not present in system then we can use exceptional handling in java to tell that file not found and the program will run error free but in C we can't do that because it doesn't provide such feature to handle with these kind of exception. In some cases C will be easy than java but here I found difficulty in doing in C. C is mostly used in system programming because it is easy to develop OS or drivers or anything easily and efficiently. Java cannot be used for this because it will make the program complicated and dealing with assembly language is not easy with java.

Comparison with respect to system utilization:-

Memory utilization by C- Programming ➜

Here a.exe is our executable file whose PID is 6292 and total memory usage is 1888k(shown in fig1.5.3) and current memory while the program is running is 268k(shown in fig 1.5.2). CPU utilization we got it as 9%.(shown in fig 1.5.1).
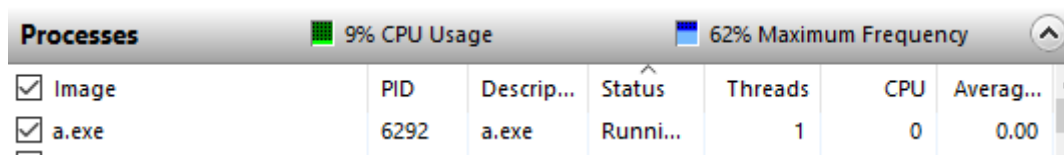
Processes		9% CPU Usage		62% Maximum Frequency			^
☑ Image	PID	Descrip...	Status	Threads	CPU	Averag...	
☑ a.exe	6292	a.exe	Runni...	1	0	0.00	

Fig 1.5.1: CPU utilization found out using task manager

Name ^	PID	Status	User name	CPU	Memory (active private working set)	UAC virtualizat...
▣ a.exe	6292	Running	animesh sr...	00	268 K	Disabled
▣ ApplicationFrameHo...	10532	Running	animesh sr...	00	6,352 K	Disabled
▣ ApplicationWebServ...	6404	Running	SYSTEM	00	1,284 K	Not allowed

```
C:\Users\animesh srivastava>tasklist

Image Name                     PID Session Name        Session#    Mem Usage
========================= ======== ================ =========== ============
a.exe                         1512 Console                    2      1,888 K
cmd.exe                       1220 Console                    2      4,056 K
conhost.exe                   2372 Console                    2     16,196 K
tasklist.exe                  7448 Console                    2      8,532 K

C:\Users\animesh srivastava>
```

Fig 1.5.2: Current Memory utilization found out using task manager

Fig 1.5.3: Memory utilization found out using cmd

Memory utilization by Java- Programming ➔

Here idea64.exe is our executable file whose PID is 12856 and total memory usage is

620552k(shown in fig1.5.6) and current memory while the program is running is 596144k(shown in

fig 1.5.5). CPU utilization we got it as 20%(shown in fig 1.5.3)

Processes	20% CPU Usage			109% Maximum Frequency			
☑ Image	PID	Descrip...	Status	Threads	CPU	Averag...	
☑ idea64.exe	9088	IntelliJ ...	Runni...	59	2	52.04	
☐ SearchUI.exe	6420	Search ...	Suspe...	35	0	0.00	

Fig 1.5.4: CPU utilization found out using task manager

Name	PID	Status	User name	CPU	Memory (active private working set)	UAC virtualizat...
⊞ idea64.exe	12856	Running	animesh sr...	00	5,96,144 K	Disabled
⊞ igfxCUIService.exe	2236	Running	SYSTEM	00	732 K	Not allowed
⊞ igfxEM.exe	7088	Running	animesh sr...	00	2,088 K	Disabled

Fig 1.5.5: Current Memory utilization found out using task manager

```
C:\Users\animesh srivastava>tasklist

Image Name                     PID Session Name        Session#    Mem Usage
========================= ======== ================ =========== ============
ShellExperienceHost.exe       8828 Console                    2     55,948 K
RuntimeBroker.exe             7796 Console                    2     23,180 K
idea64.exe                   12856 Console                    2   6,20,552 K
Taskmgr.exe                   9984 Console                    2     59,416 K
fsnotifier64.exe             12720 Console                    2      2,996 K
conhost.exe                   9628 Console                    2     10,896 K
```

Fig 1.5.6: Memory utilization found out using cmd

Therefore after comparing memory utilization and CPU utilization it can be seen that memory and CPU utilized by JAVA program is more than C program. Therefore in terms of memory and CPU utilization, C is more efficient than JAVA because C program is consuming less memory and its CPU usage is also less.