Substitute 16 V for $V$ and $5\times10^{3}\ \Omega$ for $R$ in the formula for current $I$.

$$I = \frac{V}{R}$$
$$= \frac{16}{5\times10^{3}}$$
$$= 3.2\times10^{-3}\ \text{A}$$
$$= 3.2\ \text{mA}$$

Hence, the current through the resistor is $\boxed{3.2\ \text{mA}}$.

Back

# Computer Science

## List of changes made over Version 9.1

- Replaced older examples with new examples

## List of changes made over Version 9.2

- Replaced older examples with new examples Ex E- FB…….Page no: 229
- Replaced older examples with new examples Ex F -MCQ……. Page no: 229
- Replaced older examples with new examples Ex G -TF……. Page no: 230
- Solution has been modified as per guidelines Ex I –Matching…….. Page no: 231

## List of changes made over Version 9.3

- All programming sample solutions are modified.

## Sample Solutions:

### A. Programming type questions:

**Question: VB program**

Write a program that creates a file containing the names of every president who has served only as president but not as vice-president. The program should display a message box showing information about the number of such presidents.

---

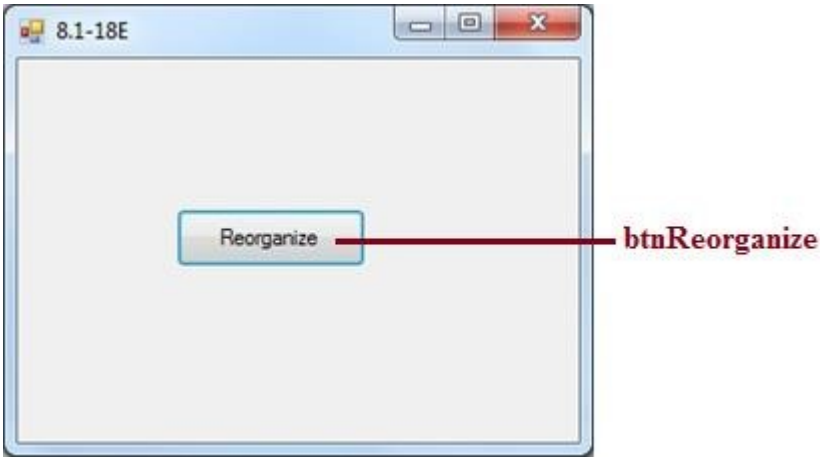
**Solution:**

**Program Plan:**

- Design the form: Place a button control on the form, and change its name and properties.
- In code window, write the necessary code.
  - To read data from two files.
  - To compare data in the two files.
  - To create a new file.
  - To save the names of those who have served as presidents but not as vice presidents in the new file.
- Display the number of the presidents who served as presidents but not as vice presidents in a message box.

**Form Design:**

View the Form Design in the IDE.




Set the Form control properties in the Properties window as follows:

| Object | Property | Setting |
|---|---|---|
| Form1 | Text | 8.1-18E |
| btnReorganize | Text | Reorganize |

**Program:**

```
'Program to read names of US Presidents and Vice-
'Presidents from two files. It finds and stores the
'names of the presidents who have served as presidents
'but not as vice presidents in new file

Private Sub btnReorganize_Click(ByVal sender As System.Object,
ByVal e As System.EventArgs) Handles btnReorganize.Click

      'Read presidents' names from the file
      Dim pres() As String =
            IO.File.ReadAllLines("USPres.txt")

      'Read vice-presidents' names from the file
      Dim visePres() As String
            =IO.File.ReadAllLines("VPres.txt")

      'compare and extract only those names which are in the
      list 'of presidents but not in the list of vice-
      presidents
      IO.File.WriteAllLines("NewFile.txt",
            pres.Except(visePres))

     'To get the new file data
      Dim data() As String =
            IO.File.ReadAllLines("NewFile.txt")

      Dim count As Integer = 0
```

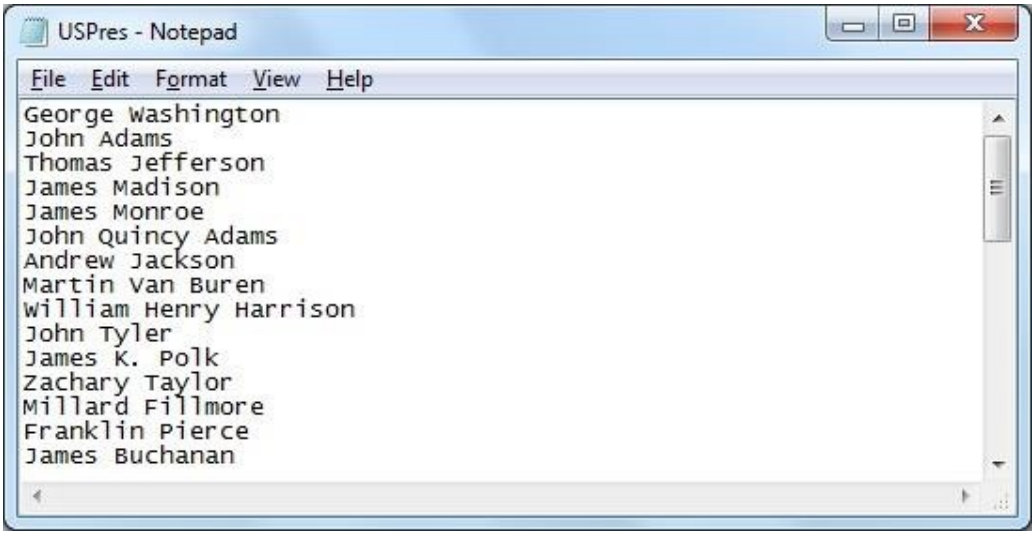
```
        'loop through the each line of the new file and 'count
        the names to display in a 'message box.
        For Each presName In data
             count=count+1
        Next

        'Displaying the count of number of names in the new 'file
        in the message box
        MessageBox.Show(count.ToString(), "Number of presidents
        who did not work as vice-president")
End Sub
```

---

**Input files details:**

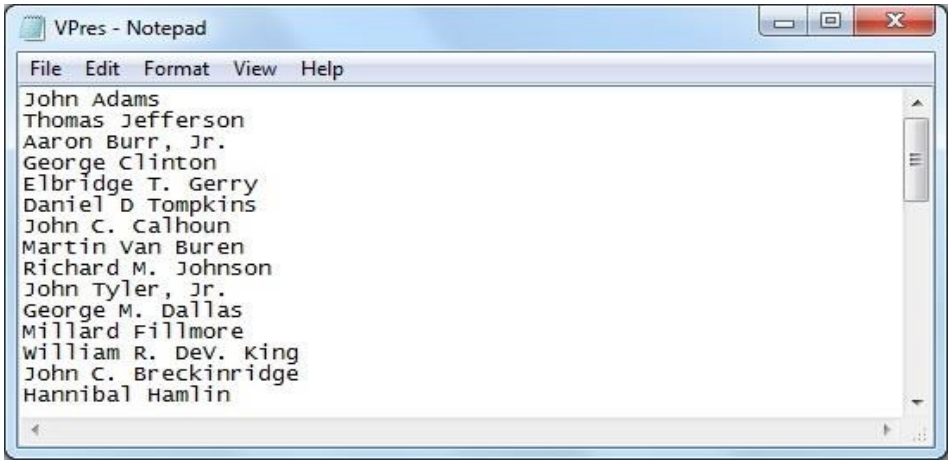
- Place the input text files in the same folder where the program executable file is located (or use the path of the input files while opening the file in the code).
    - "`USPres.txt`" file contains names of the US presidents in a sequential form.

**The screen shot of "`USPres.txt`":**




    - "`VPres.txt`" file contains names of the US vice-presidents in a sequential form.

**The screen shot of "`VPres.txt`":**




## B. Sample solution to write a function/method:

**Example Question:**

Write a recursive function "add" that computes the sum of its two integer parameters. Assume "add" does not know general addition tables but does know how to add or subtract 1.

**Solution:**

**Recursive function definition:**

The following code defines the recursive function `add`. It accepts two integer parameters and returns their sum.

- Each time the function calls itself recursively.
- It adds a value one to the first integer and subtracts one value from the second integer until the second integer becomes 0.
- Finally the first integer, which contains the cumulative value, is returned.

```
//recursive function add
int add(int m,int n)
{
   //Declare variable
   int ans;
   //If the value of n is zero then store 'm' in 'ans'.
   //Otherwise recursively call function 'add'.
   if(n==0)
         ans=m;
   else
         //recursive function call
         ans=add_recursive(m+1,n-1);
   return ans;
}
```

**Complete program is as follows:**

The following program demonstrates the functionality of the recursive function `add()`:

```
//Headers file section
#include<stdio.h>
#include<conio.h>

/* Function prototype */
int add_recursive(int m,int n);

//Program begins with a main function
int main()
{
   //Declare variables
   int m,n;
   //Clear the screen
   clrscr();
   //Promt and read the input from the keyboard
   printf("\nEnter the first integer:");
   scanf("%d",&m);
   printf("\nEnter the second integer:");
   scanf("%d",&n);

   //Display output by call add function
   printf("\nThe addition of %d and %d gives: %d",
                m,n,add(m,n));
   return 0;
}

int add(int m,int n)
{
   //Declare variable
   int ans;
   if(n==0)
        ans=m;
   else
        ans=add(m+1,n-1);
   return ans;
}
```

---

**Sample Output:**

```
      Enter the first integer :25
      Enter the second integer :25
   The addition 25 and 25 gives : 50
```

**C. Sample solution to write specific parts of the program:**

(**Note:** *As the question asks to modify the program to incorporate new operation, the same program should be used. To avoid plagiarism, give skeleton of the program along with the reference. Clearly specify where to include the modifications.*)

**Example Question:**
How would you modify the program in Fig. 11.1 so the data would be sent to the screen as well as written to the backup files?

**Solution:**
Refer FIGURE 11.1 in chapter 11 from the textbook for complete code.

To display the data that is written to the file on the screen, the following changes need to be done on the program.

The output can be displayed on the screen and can be written into the file by adding an output statement to the existing code.

The output statement that should be added is as follows:

```
putchar(ch);
```

---

The statement that is added to the code is highlighted in grey.

```
#include <stdio.h>
#define STRSIZ 80

int main(void)
{
   //add the code form the textbook here
   //         .
   //         .
   //         .

   /*copying data to backup file and sent to screen*/
   for(ch=getc(inp);ch!=EOF;ch=getc(inp))
   {
        putc(ch,outp);
        //statement to print the day to screen
        putchar(ch);
   }

   //add the code form the textbook here
   //         .
   //         .
   //         .
}
```

**Sample Output:**

```
Enter name of file you want to backup> original.txt
Enter name for backup copy> duplicate.txt
Hello world
how r u........
Copied original.txt to duplicate.txt.
```

## D. Sample solution to rectifying errors in the program:

**Example Question:**
What is wrong with the following program?

```
#include<iostream>          //Line 1
using namespace sdt;        //Line 2
int main()                  //Line 3
{                           //Line 4
   int x;                   //Line 5
   std::cin>>x;             //Line 6
   cout<<"x = "<<x<<endl;   //Line 7
   return 0;                //Line 8
}                           //Line 9
```

**Solution:**
The program contains errors in two statements. The statements containing errors are lines 2 and 7.

**The following statement is present in line 2:**

```
using namespace sdt;        //Line 2
```

**Error:**

- The error in the statement is `namespace` name.
- `sdt` is not a predefined or user defined `namespace`.
- `sdt` is misspelt. The actual `namespace` is `std`.
- To correct the error, **replace `sdt` with `std`**.

The correct statement is as follows:

```
using namespace std;        //Line 2
```

---

**The following statement is present in line 7:**

```
cout<<"x = "<<x<<endl; //Line 7
```

**Error:**

- The error in the statement is with the identifiers `cout` and `endl`.
- Since the `namespace` containing the declarations of the identifiers is not specified, errors are raised.
- To correct the error, **replace `sdt` with `std` in line 2** (previous error correction rectifies this error also).
- Statement in line 7 does not require any modifications.

## E. Sample solution for fill in the blanks:

**Question:**

_____ is the changing of a product's menu, slogan, or logo to mesh with the local culture.

---

**Solution:**

Glocalization is a combination of globalization and localization. Globalization is a process that involves conducting business worldwide.

---

Glocalization or internationalization is the process of adapting menu, slogan, or logo to match the local taste and trend.

**For example:**

- The "McD" restaurant has branches worldwide is an example of Globalization. The products, services and quality it offers are same all over the world.
- The "McD" restaurant in china or any other country has the same features like all other McD" restaurants but some of the products or services are slightly modified to match the local demands of the country are example of Glocalization

Therefore, the appropriate word to fill in the blank is **Glocalization or internationalization**.

## F. Sample solution for multiple choice questions:

**Question:**

Which of the following tabs on the Ribbon do you use to change margin settings?

a. Home
b. Page Layout
c. View
d. Insert

---

**Solution:**

Home tab is used to set the formatting of the text in the document. It consists of font clipboard group, font group, paragraph group and styles group.

---

Hence, the option (a) is incorrect.

---

View tab is used to show the document in different views like print layout, draft etc. It consists of document views group, show group, zoom group etc. Each group has a specific task to do.

---

Hence, the option (c) is incorrect.

Insert tab is used to insert tables, picture, and clip art etc. into the document. It is possible to insert different objects using different groups available on the tab such as pages, tables, illustrations, links, header & footer, symbols, and text.

---

Hence, the option (d) is incorrect.

---

- The default page margins are one inch from top, bottom, left and right sides of the document.
- However, the page margins can be changed according to the requirements.
- To change the page margins, click the margins button on the Page Layout tab.
- Hence, Page layout tab on the ribbon is used to change the margin settings.

**Hence, the correct option is b.**

### G. Sample solution for True or False questions:

**Question**

Information integrity ensures that data can be modified only by appropriate mechanisms. (True/False)

---

**Solution**

- Information security involves set of security rules and techniques that must be followed by every individual who is given permission to access to an organization's technology and information assets.
- Information security takes measures to see that any unauthorized person does not modify information.

---

- Appropriate mechanisms are used to modify data to achieve information integrity.

Hence, the statement is **TRUE.**

### H. Sample solution for differences between two concepts:

**Example Question:**
What are the differences between Accounting format and Currency Format?

**Solution:**
Currency and Accounting formats are used to display monetary values. Both the formats add the thousand separators to the currency value and display only two digits after the decimal point.

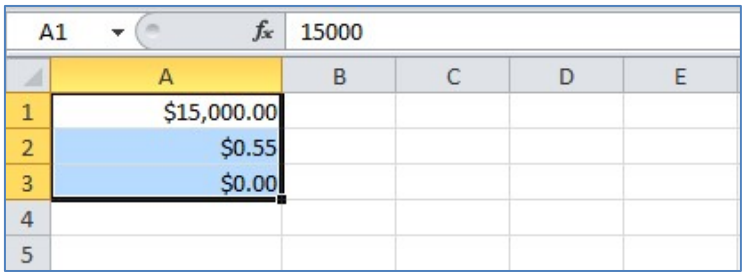
---

The differences between Accounting format and Currency Format are as follows:

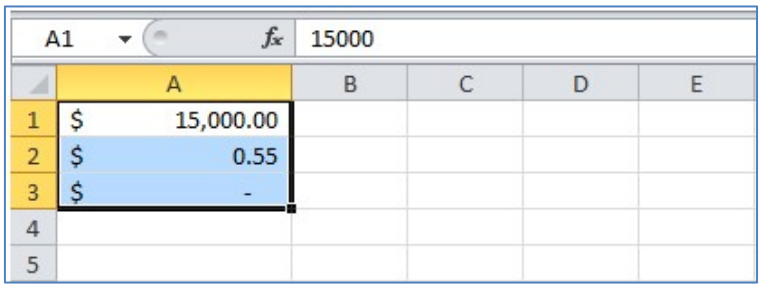
| Accounting format | Currency format |
|---|---|
| Accounting format displays currency symbol at the left edge of the cell. | Currency format displays currency symbol to the next left of the first digit of the currency value. |
| Accounting format displays negative numbers by enclosing the value in a pair of parentheses ( ). | Currency format displays negative numbers with minus (-) sign before the currency symbol. |
| Accounting format displays zero values with a dash (-) symbol. | Currency format displays zero values as usual. |

---

**Screen shot of currency format:**




**Screen shot of accounting format:**




## I. Matching questions:

**Question:**

Match the following key terms with the appropriate definitions:

i. Social network analysis
ii. Measures
iii. Master data
iv. Web content mining

a. They are numbers or values which can be analyzed by the users.

b. It is a technique to explore group of people who are experts in a particular subject areas, to explore people who need to collaborate but not collaborating, to explore people that are working together.
c. Textual information is extracted from Web documents.
d. In the operation of a business this data is deemed most important.

**Solution:**

Following are the matched definitions corresponding to the given terms:

i. In social network analysis technique, people's contacts are mapped to discover the missed links within the organization.
**Therefore, the term "Social network analysis" matches with definition (b).**

---

ii. Measures or facts are numbers or values (related business etc.) that are used by the user for analysis.
**Therefore, the term "Measures" matches with definition (a).**

iii. In the business operations, the data that is deemed to be most important is master data.
**Therefore, the term "Master data" matches with definition (d).**

---

iv. The textual information in Web documents is extracted. This process of extraction is known as Web content mining.
**Therefore, the term "Web content mining" matches with definition (c).**

| Term | Definition |
|---|---|
| i. Social network analysis | b |
| ii. Measures | a |
| iii. Master data | d |
| iv. Web content mining | c |

## J. Sample solution for theoretical questions

**Example Question:**
When recursion is used to solve a problem, why must the recursive module call itself to solve a smaller version of the original problem?

**Solution:**
A recursive module works as follows:

1. If the problem can be solved now, without recursion, then the module solves it and returns. This is known as base call.
2. If the problem cannot be solved now, then the module reduces into a smaller but similar problem and calls itself to solve the smaller problem.

---

By reducing the problem with each recursive call, the base case will eventually be reached and the recursion will stop. So, a recursive module calls itself to solve a smaller version of problems.

## K. Sample solution for problematic questions:

**Example Question:**
Calculate the bandwidth necessary for transmitting in real time for video at resolution of $640\times$ 480, 3 bytes/pixel, 30 frames/second.

**Solution:**
Resolution of a video means number of pixels used in the completion of 1 frame.
Then, Size of 1 pixel $=3$ bytes

$$\text{Size of 1 frame} = 640\times480 \text{ pixels}$$
$$= 640\times480\times3 \text{ bytes}$$

Number of frames can transfer in one second is 30 frames

The bandwidth for transmitting data:

$$= 640\times480\times3\times30 \text{ bytes/sec}$$
$$= 27648000 \text{ bytes/second}$$
$$= \frac{27648000 \text{ bytes/second}}{2^{20}} \quad \left(\text{Since, } 1\text{MB}=2^{20} \text{ bytes}\right)$$
$$= 26.367 \text{ MB/sec}$$
$$\approx 26.4\text{MB/sec}$$

Hence, the bandwidth is **26.4 MB / sec**