

<b>Course Code</b>	:	<b>MCSL-054</b>
<b>Course Title</b>	:	<b>Laboratory Course</b>
<b>Assignment Number</b>	:	<b>MCA(V)-054/Assignment/2018-19</b>
<b>Maximum Marks</b>	:	<b>100</b>
<b>Weightage</b>	:	<b>25%</b>
<b>Last Date of Submission</b>	:	<b>15th October, 2018 (For July Session)</b>
<b>15th April, 2019 (For January Session)</b>		

### **PART-I: MCS-051 (Advanced Internet Technologies)**

#### **Question 1:**

**Develop a web page using servlet to display your profile. Make necessary assumptions.**

Ans. In this page, we have getting input from the user using text fields and combobox. The information entered by the user is forwarded to Register servlet, which is responsible to store the data into the database.

```
<html>
<body>
<form action="servlet/Register" method="post">
Name:<input type="text" name="userName"/><br/><br/>
Password:<input type="password" name="userPass"/><br/><br/>
Email Id:<input type="text" name="userEmail"/><br/><br/>
Country:
<select name="userCountry">
<option>India</option>
<option>Pakistan</option>
<option>other</option>
</select>
<br/><br/>
<input type="submit" value="register"/>
</form>
</body>
</html>
```

#### **Register.java**

This servlet class receives all the data entered by user and stores it into the database. Here, we are performing the database logic. But you may separate it, which will be better for the web application.

```
import java.io.*;
import java.sql.*;
import javax.servlet.ServletException;
import javax.servlet.http.*;

public class Register extends HttpServlet {
    public void doPost(HttpServletRequest request, HttpServletResponse response)
        throws ServletException, IOException {
```

```
response.setContentType("text/html");
PrintWriter out = response.getWriter();
String n=request.getParameter("userName");
String p=request.getParameter("userPass");
String e=request.getParameter("userEmail");
String c=request.getParameter("userCountry");
try{
Class.forName("oracle.jdbc.driver.OracleDriver");
Connection con=DriverManager.getConnection(
"jdbc:oracle:thin:@localhost:1521:xe","system","oracle");
PreparedStatement ps=con.prepareStatement(
"insert into registeruser values(?,?,?,?)");
ps.setString(1,n);
ps.setString(2,p);
ps.setString(3,e);
ps.setString(4,c);
int i=ps.executeUpdate();
if(i>0)
out.print("You are successfully registered...");
}catch (Exception e2) {System.out.println(e2);}
out.close();
}
}
```

web.xml file

The is the configuration file, providing information about the servlet.

```
<web-app>
<servlet>
<servlet-name>Register</servlet-name>
<servlet-class>Register</servlet-class>
</servlet>
<servlet-mapping>
<servlet-name>Register</servlet-name>
<url-pattern>/servlet/Register</url-pattern>
</servlet-mapping>
<welcome-file-list>
<welcome-file>register.html</welcome-file>
</welcome-file-list>
</web-app>
```

### **Question 2:**

**Write a JSP program for your Study Centre , which displays a web page containing two web links, one for Counselling Schedule and other for Examination Schedule. On clicking Counselling Schedule link, it goes to a JSP page which display course wise counselling schedule with name of**

**counsellors, class room/ laboratory. On clicking the Examination Schedule link JSP page with schedule of Viva- Voce schedule for assignments of courses of MCA 5th Semester is opened.**

Ans.

```
<html>
<head>
<meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
<title>Main</title>
</head>
<body>
<br><br><br>
<center> <a href="detailofstudycenter.jsp"><h2>View Details of study
center</h2></a></center> <br>
<center> <a href="faqonpractilds.jsp"><h2>View Faq on MCA
Practils</h2></a></center>
</body>
</html>
detailofstudycenter.jsp
<html>
<head>
<meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
<title>Student Centre Detail Page:</title>
</head>
<body>
<table align="center" border="1">
<tr>
<td>Study Centre Name :</td>
<td> Karrox IGNOU Study Centre </td>
</tr>
<tr>
<td>Address :</td>
<td> karrox technologies Ltd, Opp Shreyas Cinema, Ghatkopar(w),Mumbai-86
</td>
</tr>
<tr>
<td>
```



<td>Phone Number :</td>

<td> 022-25699002 </td>

</tr>

<tr>

<td>Email :</td>

<td> ignou@karrox.com </td>

</tr>

<tr>

<td>Program Coordinator :</td>

<td> Mudadi Sanyasi J</td> </tr>

<tr> <td> counselling schedule for MCA :</td>

<td><a href ="schedule.doc"> click here</a></td> </tr>

</table>

</body>

</html>

faqonpracticls.jsp

<html>

<head>

<meta http-equiv="Content-Type" content="text/html; charset=UTF-8">

<title>FAQs</title>

</head>

<body><br><br><br>

## FAQs on Practicals

<p>

Q1. If attendance is less than 75% in practical session of a course due to some reasons can student get any help/consideration?

<br><br>

Ans : The student will NOT be allowed to appear in Term-End Practical Exam.

</p> <p>

Q2. If Attendance is less than 75% then how can a student give Term-End Practical Exam?

<br><br>

Ans : The student will NOT be allowed to appear in Term-End Practical Exam. </p>

<p>

Q3. Can the MCA students appear in the Term-End Practical Exam without filling the Term-End Exam Form ?

<br><br>

Ans : No. </p> <p>Q4. What should we do to give my Backlog Term End Practical Exam ? <br><br>

Ans : Collect attendance proof from the study Centre & then submit to IGNOU Regional Centre before your Term End Examination (Theory).

</p>

</body>

</html>

### **Question 3:**

**Write a program using JDBC and JSP to display the current balance from a saving bank account.**

**The program should take account number or registered mobile number as input.**

Ans.

### **Program for Customer Login Page**

//signin.html

<html>

<title><signin></title>

<form method="Get" action="Check"> <FONT SIZE="20" FACE="courier" COLOR=blue> <body bgcolor="#E7E7EF"><br><br><br>



```
<center><table>

<tr><td><h3>Account No</h3></td><td><input type=text name="user"></td></tr>
<tr><td><h3>Password</h3></td><td><input type=password name="pass"></td></tr> <tr><th
COLSPAN="2"><input type=submit value="SUBMIT" name="SUBMIT"></th></tr>

</table>
```

```
</center>
```

```
</body>
```

```
</html>
```

```
//Check.java
import javax.servlet.*;
import java.io.*;
import java.sql.*;
import javax.servlet.http.*;
public class Check extends HttpServlet {

public void service(HttpServletRequest request, HttpServletResponse response) throws
ServletException, java.io.IOException {
    PrintWriter out=response.getWriter();

    String acno=request.getParameter("user");

    System.out.println(acno);

    String pass=request.getParameter("pass");

    HttpSession session=request.getSession();
    session.setAttribute("sess",acno);

    try{
        Class.forName("sun.jdbc.odbc.JdbcOdbcDriver");
        Connection con = DriverManager.getConnection("jdbc:odbc:ques");
        Statement st=con.createStatement();
        ResultSet rs=st.executeQuery("select * from bank where pass='"+pass+"' and Acno='"+acno'");
        if(rs.next()) {

            String s1=rs.getString(1);

            out.println("name"+s1);

            RequestDispatcher rd=request.getRequestDispatcher("/user.jsp");

            rd.forward(request,response);
```

```
} else {
```

```
RequestDispatcher
```

```
rd=request.getRequestDispatcher("signin.html");
```

```
rd.forward(request,response);
```

```
}
```

```
} catch(Exception e){
```

```
}
```

```
}
```

```
}
```

**User operation page** //user.jsp

```
<html>
```

```
<body bgcolor="#ccccdd">
```

```
<% String acno=(String)session.getAttribute("sess");
```

```
System.out.println(acno); %>
```

```
<center>
```

```
<a href="debit.html">Debit the Amount</a><br> <a href="credit.html">Credit the Amount</a><br>
```

```
<a href="month.jsp">Monthly Record</a><br>
```

```
</center>
```

```
</body>
```

```
</html>
```

**Credit Design Page**

```
//credit.html
```

```
<html>
```

```
<Head>
```

```
<center>Welcome to the credit page</center></head> <form action="credit.jsp">
```

```
<body bgcolor="#ccccdd"><center><table>
```

```
<tr><td>Enter the Account NO</td><td><input type="text" name="ac"></td></tr>
```

```
<tr><td>Enter the Amount</td><td><input type="text" name="amnt"></td></tr>
```

```
<tr><td><input type="submit" value="credit"></td></tr></table></center>
```

```
</body>
```

&lt;/form&gt;

&lt;/html&gt;

**Debit Design Page**

//debit.html

&lt;html&gt;

&lt;Head&gt;

&lt;center&gt; Welcome to the Debit page&lt;/center&gt;

&lt;/head&gt;

&lt;form action="debit.jsp"&gt;

&lt;body bgcolor="#ccccdd"&gt;&lt;center&gt;&lt;table&gt;

&lt;tr&gt;&lt;td&gt;Enter the Account NO&lt;/td&gt;&lt;td&gt;&lt;input type="text" name="ac"&gt;&lt;/td&gt;&lt;/tr&gt;

&lt;tr&gt;&lt;td&gt;Enter the Amount&lt;/td&gt;&lt;td&gt;&lt;input type="text" name="amnt"&gt;&lt;/td&gt;&lt;/tr&gt;

&lt;tr&gt;&lt;td&gt;&lt;input type="submit" value="Debit"&gt;&lt;/td&gt;&lt;/tr&gt;&lt;/table&gt;&lt;/center&gt;

&lt;/body&gt;

&lt;/form&gt;

&lt;/html&gt;

**Program to Credit the Amount and Display the balance**

//credit.jsp

&lt;html&gt;

&lt;%@ page import="java.sql.\*"%&gt;

&lt;%@ page import="java.util.\*"%&gt;

&lt;%

String amount=request.getParameter("amnt");

int iamount=Integer.parseInt(amount);

String acnt=request.getParameter("ac");

int acno=Integer.parseInt(acnt);

String type="Credit";

Calendar calendar = new GregorianCalendar();

System.out.println("YEAR: " + calendar.get(Calendar.YEAR));

System.out.println("MONTH: " + calendar.get(Calendar.MONTH));

System.out.println("DATE: " + calendar.get(Calendar.DATE));

String dor

=String.valueOf(calendar.get(Calendar.DATE))+"/"+String.valueOf(calendar.get(Calendar.MONTH))+"/"+String.valueOf(calendar.get(Calendar.YEAR));

try{

Class.forName("sun.jdbc.odbc.JdbcOdbcDriver");

Connection con = DriverManager.getConnection("jdbc:odbc:ques");

Statement st=con.createStatement();



```
ResultSet rs=st.executeQuery("select * from bank where Acno="+acno);

int totbal=0;

while(rs.next())

{

int s1=rs.getInt(5);

totbal=s1-iamount;

if(totbal<=0) { out.println("Your amount is credited you have to pay Rs"+totbal);

} else { out.println("Your amount is credited Your balance is"+totbal);

}

}

PreparedStatement pstmt = con.prepareStatement("update bank set balance=? where

Acno="+acno);

pstmt.setInt(1,totbal);

int i = pstmt.executeUpdate();

PreparedStatement pstmt1 = con.prepareStatement("insert into month values(?,?,?,?)");

pstmt1.setString(1,dor);

pstmt1.setInt(2,totbal);

pstmt1.setInt(3,acno); pstmt1.setString(4,type);

pstmt1.setInt(5,iamount);

int i1 = pstmt1.executeUpdate();

}

catch(Exception e){

}

%>
</html>

Program to Credit the Amount and Display the balance
//debit.jsp
<html>
<body>
```

```
<%@ page import="java.sql.*"%>
<%@ page import="java.util.*"%>
<%
String amount=request.getParameter("amnt");
int iamount=Integer.parseInt(amount);
String acnt=request.getParameter("ac");

int acno=Integer.parseInt(acnt);

String type="Debit";
Calendar calendar = new GregorianCalendar();
System.out.println("YEAR: " + calendar.get(Calendar.YEAR));
System.out.println("MONTH: " + calendar.get(Calendar.MONTH));
System.out.println("DATE: " + calendar.get(Calendar.DATE));
String dor
=String.valueOf(calendar.get(Calendar.DATE))+"/"+String.valueOf(calendar.get(Calendar.MONTH
))+"/"+String.valueOf(calendar.get(Calendar.YEAR));
try {
Class.forName("sun.jdbc.odbc.JdbcOdbcDriver");

Connection con = DriverManager.getConnection("jdbc:odbc:ques");

Statement st=con.createStatement();

ResultSet rs=st.executeQuery("select * from bank where Acno="+acno);

int totbal=0;

while(rs.next())
{ int s1=rs.getInt(5);
if(s1>=500) { totbal=s1-iamount; out.println("Amount is Debited successfully");
out.println("Your balance is "+totbal);
}
else{
out.println("Your balance is less than 500,You can't debit the amount"); totbal=s1;
}
}
PreparedStatement pstmt = con.prepareStatement("update bank set balance=? where Acno="+acno);
pstmt.setInt(1,totbal);
int i = pstmt.executeUpdate();
PreparedStatement pstmt1 = con.prepareStatement("insert into month values(?,?,?,?)");
pstmt1.setString(1,dor);
pstmt1.setInt(2,totbal);
pstmt1.setInt(3,acno);
pstmt1.setString(4,type);
pstmt1.setInt(5,iamount);
int i1 = pstmt1.executeUpdate();
}
catch(Exception e){
```

```
}  
%>  
</html>
```

### Program to print the monthly Report

```
//month.jsp
```

```
<html>  
<%@ page import="java.sql.*"%>  
<%  
String acno=(String)session.getAttribute("sess");  
  
System.out.println(acno); int chk=Integer.parseInt(acno);  
  
int l=0;  
int rowcu=0;  
int totalRecords=0;  
ResultSetMetaData rsmt=null;  
ResultSet datars=null;  
try{ Class.forName("sun.jdbc.odbc.JdbcOdbcDriver");  
Connection cot=DriverManager.getConnection("jdbc:odbc:ques");  
Statement stmnt=cot.createStatement();  
Statement rowc=cot.createStatement();  
Statement datas=cot.createStatement();  
ResultSet resultt=stmnt.executeQuery("select * from month");  
ResultSet resucourow=datas.executeQuery("select * from month where Acno="+chk);  
int x=0;  
while(resucourow.next()){ x++;  
} resultt.next(); rsmt=resultt.getMetaData();  
l=rsmt.getColumnCount(); System.out.println("Column Count"+l);  
System.out.println("Column Count Rowssss "+x);  
datars=rowc.executeQuery("select * from month where Acno="+chk);
```

```

} catch(Exception e1){
}

%>

<table border="1" bordercolorlight="#CCCC99" bordercolordark="#999966">

<tr> <%for(int v=1;v<=l;v++){System.out.println("I value"+l);

String cnames=rsmt.getColumnName(v);%>

<td width="50%"><font face="Arial, Helvetica" color = 'red'
size='5'><b><i><%=cnames.toUpperCase()%></i></b></font></td> <%}%> </tr><%
while(datars.next()){%>

<tr><%for(int vc=1;vc<=l;vc++){%> <td width="50%"><font face="Arial,
Helvetica"><%=datars.getString(vc)%></font></td><% } %>

</html>

```

**Question 4:**  
**Create an XML document for students for library.**

Ans.

```

<?xml version="1.0" standalone="yes"?>
<!DOCTYPE Library [
<!ELEMENT Library (Book+)>
<!ELEMENT Book (Author,Title)>
<!ELEMENT Author (#PCDATA)>
<!ELEMENT Title (#PCDATA)>
<!ATTLIST Title lang CDATA #REQUIRED> ]>

<Library>
<Book>
<author>Bill Gates</author>
<title lang="en">The Road Ahead</title>
</Book>
</Library>

```

DTD file – lib.dtd , It defines structure of library.

```
1 <!ELEMENT Library (Book+)>
2 <!ELEMENT Book (Author,Title)>
3 <!ELEMENT Author (#PCDATA)>
4 <!ELEMENT Title (#PCDATA)>
5 <!ATTLIST Title lang CDATA #REQUIRED>
```

XML file with external dtd file – lib.dtd

```
1 <!DOCTYPE Library SYSTEM "lib.dtd">
2 <Library>
3 <Book>
4 <author>Bill Gates</author>
5 <title lang="en">The Road Ahead</title>
6 </Book>
7 </Library>
```

#### PCDATA & CDATA

- PCDATA – It is a text that will be parsed by a parser. Tags inside the text will be treated as markup and entities will be expanded.
- CDATA – It specifies the character string data. It is text that will *not* be parsed by a parser. Tags inside the text will *not* be treated as markup and entities will not be expanded.

### PART-II: MCS-053 (Computer Graphics and Multimedia)

#### Question 1:

**Write a program in C/C++ using OpenGL to draw a circle of orange colour and inside that draw a square of blue colour.**

Ans.

```
#include <windows.h>
#include <gl/glut.h>
#include <math.h>
const float PI=3.14;
void drawCircle(){
glBegin(GL_LINE_LOOP);
glColor3f(1.0,0.0,0.0);
for(int i=0; i <= 300; i++){
double angle = 2 * PI * i / 300;
double x = 5*cos(angle);
double y = 5*sin(angle);

glVertex2d(x,y);
}
glEnd();
```



```

}
void drawRect(){
glColor3f(0.0,0.0,1.0);
glRectf(-5.0,5.0,5.0,-5.0);
}
void init(void){
glClearColor(0.0,1.0,0.0,0.0);
glMatrixMode(GL_PROJECTION);
glLoadIdentity();
glOrtho(-10.0,10.0,-10.0,10.0,-10.0,10.0);
}
void display(void)
{
glClear(GL_COLOR_BUFFER_BIT);
drawRect();
drawCircle();
glutSwapBuffers();
}
int main(int argc, char** argv){
glutInit(&argc,argv);
glutInitDisplayMode(GLUT_DOUBLE|GLUT_RGB);

glutInitWindowSize(320,320);
glutInitWindowPosition(50,50);
glutCreateWindow("2D Shapes");
init();
glutDisplayFunc(display);
glutMainLoop();
return 0;
}

```

### Question 2:

**Write a program in C/C++ using OpenGL to draw a hard wire house as shown in figure given below. Use basic primitives of OpenGL.**

Ans.

```

#include<Windows.h>
// for MS Windows
#include<GL\glut.h>
// GLUT, include glu.h and gl.h
//Note: GL\glut.h path depending on the system in use
void init()
{
// Set display window color to as glClearColor(R,G,B,Alpha)
glClearColor(0.5, 0.9, 0.4, 0.0);
// Set projection parameters.
glMatrixMode(GL_PROJECTION);
// Set 2D Transformation as gluOrtho2D(Min Width, Max Width, Min Height, Max Height)

```

```
gluOrtho2D(0.0, 800, 0.0, 600);
}
void home()
{
//Roof
glClear(GL_COLOR_BUFFER_BIT); // Clear display window
// Set line segment color as glColor3f(R,G,B)
glColor3f(0.3, 0.5, 0.8);
glBegin(GL_POLYGON);
glVertex2i(200, 500);
glVertex2i(600, 500);
glVertex2i(700, 350);
glVertex2i(300, 350);
glEnd();
// Top of Front Wall
glColor3f(0.1, 0.5, 0.0);
glBegin(GL_TRIANGLES);
glVertex2i(200, 500);
glVertex2i(100, 350);
glVertex2i(300, 350);
glEnd();
// Front Wall
glColor3f(0.7, 0.2, 0.3);
glBegin(GL_POLYGON);
glVertex2i(100, 350);
glVertex2i(300, 350);
glVertex2i(300, 100);
glVertex2i(100, 100);
glEnd();
// Front Door
glColor3f(0.7, 0.2, 0.9);
glBegin(GL_POLYGON);
glVertex2i(150, 250);
glVertex2i(250, 250);
glVertex2i(250, 100);
glVertex2i(150, 100);
glEnd();
// Front Door Lock
glColor3f(0.3, 0.7, 0.9);
glPointSize(15);
glBegin(GL_POINTS);
glVertex2i(170, 170);
glEnd();
//side Wall
glColor3f(0.1, 0.2, 0.3);
glBegin(GL_POLYGON);
glVertex2i(300, 350);
glVertex2i(700, 350);
glVertex2i(700, 100);
```

```
glVertex2i(300, 100);
glEnd();
// window one
glColor3f(0.2, 0.4, 0.3);
glBegin(GL_POLYGON);
glVertex2i(330, 320);
glVertex2i(450, 320);
glVertex2i(450, 230);
glVertex2i(330, 230);
glEnd();
// line of window one
glColor3f(0.1, 0.7, 0.5);
glLineWidth(5);
glBegin(GL_LINES);
glVertex2i(390, 320);
glVertex2i(390, 230);
glVertex2i(330, 273);
glVertex2i(450, 273);
glEnd();
// window two
glColor3f(0.2, 0.4, 0.3);
glBegin(GL_POLYGON);
glVertex2i(530, 320);
glVertex2i(650, 320);
glVertex2i(650, 230);
glVertex2i(530, 230);
glEnd();
// lines of window two
glColor3f(0.1, 0.7, 0.5);
glLineWidth(5);
glBegin(GL_LINES);
glVertex2i(590, 320);
glVertex2i(590, 230);
glVertex2i(530, 273);
glVertex2i(650, 273);
glEnd();
// Entrance Path
glColor3f(0.3, 0.5, 0.7);
glLineWidth(3);
glBegin(GL_POLYGON);
glVertex2i(150, 100);
glVertex2i(250, 100);
glVertex2i(210, 0);
glVertex2i(40, 0);
glEnd();
// Process all OpenGL routine s as quickly as possible
glFlush();
}
int main(int argc, char ** argv)
```

```
{  
// Initialize GLUT  
glutInit(&argc, argv);  
// Set display mode  
glutInitDisplayMode(GLUT_SINGLE | GLUT_RGB);  
// Set top - left display window position.  
glutInitWindowPosition(100, 100);  
// Set display window width and height  
glutInitWindowSize(800, 600);  
// Create display window with the given title  
glutCreateWindow("2D House in OpenGL ");  
// Execute initialization procedure  
init();  
// Send graphics to display window  
glutDisplayFunc(home);  
// Display everything and wait.  
glutMainLoop();  
}
```

**Question 3:**

**Write a program in C/C++ to implement Bresenham's circle generation algorithm.**

Ans.

```
# include<stdio.h>  
# include<conio.h>  
# include<graphics.h>  
# include<math.h>  
  
void main()  
{  
  
int gd=DETECT,gm; int r,x,y,p,xc=320,yc=240;  
  
initgraph(&gd,&gm,"C:\\TC\\BGI");  
  
cleardevice();  
  
printf("Enter the radius ");  
  
scanf("%d",&r);  
  
x=0;  
  
y=r;
```

```
putpixel(xc+x,yc-y,1);  
p=3-(2*r);  
for(x=0;x<=y;x++)  
{  
if (p<0) { y=y; p=(p+(4*x)+6);  
}  
Else  
{ y=y-1; p=p+((4*(x-y)+10));  
}  
putpixel(xc+x,yc-y,1);  
putpixel(xc-x,yc-y,2);  
putpixel(xc+x,yc+y,3);  
putpixel(xc-x,yc+y,4);  
putpixel(xc+y,yc-x,5);  
putpixel(xc-y,yc-x,6);  
putpixel(xc+y,yc+x,7);  
putpixel(xc-y,yc+x,8);  
}  
getch();  
closegraph();  
}
```

**Question 4:**

**Write a program in C/C++ to implement Cohen-Sutherland line clipping algorithm. In this implementation consider two cases of a line: totally visible, totally invisible, against the rectangular clipping window.**

Ans.



This is one of the oldest and most popular line clipping algorithm. To speed up the process this algorithm performs initial tests that reduce number of intersections that must be calculated. It does so by using a 4 bit code called as region code or outcodes. These codes identify location of the end point of line.

Each bit position indicates a direction, starting from the rightmost position of each bit indicates left, right, bottom, top respectively.

Once we establish region codes for both the endpoints of a line we determine whether the endpoint is visible, partially visible or invisible with the help of ANDing of the region codes.

#### Algorithm

1. Read 2 end points of line as  $p1(x1,y1)$  and  $p2(x2,y2)$
2. Read 2 corner points of the clipping window (left-top and right-bottom) as  $(wx1,wy1)$  and  $(wx2,wy2)$
3. Assign the region codes for 2 endpoints  $p1$  and  $p2$  using following steps:-  
initialize code with 0000

Set bit 1 if  $x < wx1$

Set bit 2 if  $x > wx2$

Set bit 3 if  $y < wy2$

Set bit 4 if  $y > wy1$

4. Check for visibility of line

If region codes for both endpoints are zero then line is completely visible. Draw the line go to step 9.

If region codes for endpoints are not zero and logical ANDing of them is also nonzero then line is invisible. Discard the line and move to step 9.

If it does not satisfy 4.a and 4.b then line is partially visible.

5. Determine the intersecting edge of clipping window as follows:-

If region codes for both endpoints are nonzero find intersection points  $p1'$  and  $p2'$  with boundary edges.

If region codes for any one end point is non zero then find intersection point  $p1'$  or  $p2'$ .

6. Divide the line segments considering intersection points.

7. Reject line segment if any end point of line appears outside of any boundary.

8. Draw the clipped line segment.

9. Stop.