Calculation of Area & Volume of 3D Diagrams using Visual Basic 6.0

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Abstract: Visual Basic 6.0 is one of the important and basic tools to develop projects easily and effectively which can cater the needs of the user. In this article the basic operations of mathematics are there. The article is focusing the middle or high school students. In this a proposal is given for the calculation of area and volume of 3D diagrams using VB 6.0. The main purpose is to make study easier at school levels. Various tools of VB are used in this article i.e. how to declare variables, implementation of mathematical formulae in VB, LoadPicture, use of sroot, username password page, connectivity of various pages etc. Also the functions like date (), time (), windowstate etc. are implemented in the project.

IndexTerms - VB 6.0, date (), time (), windowstate, LoadPicture, 3D diagrams..

I. INTRODUCTION TO VISUAL BASIC
Visual Basic is a popular language for making Graphic User Interface (GUI) applications. The work in this language is easy and in projects VB is used as frontend development where as for backend databases MS Access, Oracle etc. can be used. This language can also be utilized to make game software. The student having good knowledge of this language can be easily absorbed in a software developing company as a programmer [2]

II. INTRODUCTION TO ARTICLE
The article contains various formulae of mathematics implemented in VB 6.0. This project has no database connectivity. Only the frontend application is there. Formulae used in the project are as below in the table:

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Shape</th>
<th>Formulae</th>
<th>Meaning of the terms used</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cube</td>
<td>Face Diagonal = (2 \cdot a)</td>
<td>a = side of the cube</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Body Diagonal = (3 \cdot a)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Surface Area = (6 \cdot a^2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Volume = (a^3)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Cuboid</td>
<td>Body Diagonal = (l^2 + b^2 + h^2)</td>
<td>l = length of the cuboid, b = breadth of the cuboid, h = height of the cuboid</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Surface Area = (2(l \cdot b + b \cdot h + h \cdot l))</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Volume = (l \cdot b \cdot h)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Sphere</td>
<td>Surface Area = (4 \cdot \pi \cdot r^2)</td>
<td>(\pi = 3.14) (constant), r = Radius of the Sphere</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Volume = (\frac{4}{3} \cdot \pi \cdot r^3)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Cylinder</td>
<td>Lateral Surface Area = (2 \cdot \pi \cdot r \cdot h)</td>
<td>(\pi = 3.14) (constant), r = Radius of base of the cylinder, h = height of the cylinder</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Curved Surface Area = (\pi \cdot r \cdot l)</td>
<td>(\pi = 3.14) (constant), r = Radius of base of the cone, h =</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total Surface Area = (\pi \cdot r \cdot (r + l))</td>
<td></td>
</tr>
</tbody>
</table>
III. HOW TO START

After installing Microsoft Visual Basic 6.0 on your system, first of all you have to click on start button then follow the path where VB is placed as shown in figure 1.1. After clicking on Microsoft Visual Basic 6.0 icon you can see a window similar to shown in figure 1.2. After that by clicking on standard exe you can start your project as shown in figure 1.3 (a). In figure 1.3 a tool box is shown on the left hand side, the detail of the tool box is shown in the figure 1.3(b). The programmer can pick any of the tools and can draw on the form.

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| Cone | Volume = \( \frac{1}{3} \pi r^2 h \) | height of the cone, \( l = \) slant height of the cone |

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Figure 1.1: Start of Visual Basic 6.0

Figure 1.2: Showing Standard EXE

Figure 1.3 (a): Start of the Project from here

Figure 1.3 (b): Tool Box\(^\text{(a)}\)
IV. USER NAME AND PASSWORD PAGE

![User Name Password Form](image)

**Figure 1.4:** User Name Password Form

**Coding:**

```vbnet
Dim n As Integer
Private Sub cmdExit_Click()
    End
End Sub
Private Sub cmdOk_Click()
    If txtUserName.Text = "abc" And txtPassword.Text = "123" Then frmMain.Show frmMain.WindowState = 2 Else MsgBox "Please enter the correct User Name or Password" End If End Sub
```

V. MAIN FORM:

![Main Form](image)

**Figure 1.5:** Main Form

**Coding:**

```vbnet
Private Sub mnuAreaCone_Click() frmCone.Show frmCone.WindowState = 2 End Sub
Private Sub mnuAreaCube_Click() frmCube.Show frmCube.WindowState = 2 End Sub
Private Sub mnuAreaCuboid_Click() frmCuboid.Show frmCuboid.WindowState = 2 End Sub
Private Sub mnuAreaCylinder_Click() frmCylinder.Show frmCylinder.WindowState = 2 End Sub
Private Sub mnuAreaSphere_Click() frmSphere.Show frmSphere.WindowState = 2 End Sub
Private Sub mnuCone_Click() Picture1.Picture = LoadPicture("C:\vbpro\pics\cone.jpg") End Sub
Private Sub mnuCube_Click() Picture1.Picture = LoadPicture("C:\vbpro\pics\cube.jpg") End Sub
Private Sub mnuCuboid_Click() Picture1.Picture = LoadPicture("C:\vbpro\pics\cuboid.jpg") End Sub
Private Sub mnuCylinder_Click() Picture1.Picture = LoadPicture("C:\vbpro\pics\cylinder.jpg") End Sub
Private Sub mnuSphere_Click() Picture1.Picture = LoadPicture("C:\vbpro\pics\sphere.jpg") End Sub
Private Sub Timer1_Timer()
    Text1.Text = Format(Now, "dddd, mmmm dd, yyyy")
    Text2.Text = Format(Now, "hh:mm:ss AM/PM")
End Sub
```

VI. CUBE FORM:
VII. CUBOID FORM:

Coding:
Dim l, b, h, sa, v, bd As Single
Private Sub cmdFormulae_Click()
Label1.Caption = "Surface Area = 2(LB+BH+HL)" Label2.Caption = "Volume = LBH"
End Sub
Private Sub cmdResult_Click()
Private Sub Form_Load()
Picture1.Picture = LoadPicture("C:\vbpro\pics\cube.jpg")
End Sub
Label3.Caption = "Body Diagonal  
= Sqrt(L^2+B^2+H^2)"

End Sub

Private Sub cmdResult_Click()
l = txtL.Text  b = txtB.Text  h = txtH.Text
sa = 2 * ((l * b) + (b * h) + (h * l))  v = l * b * h
bd = Sqrt(l^2 + b^2 + h^2)  txtSA.Text = sa
v = txtV.Text  v = round(v, 2)  txtBD.Text = bd

txtSA.Text = round(txtSA.Text, 2)  txtV.Text = round(txtV.Text, 2)  txtBD.Text = round(txtBD.Text, 2)  End Sub

Private Sub Form_Load()
Picture1.Picture = LoadPicture("C:\vbpro\pics\cuboid.jpg")  End Sub

VIII. SPHERE FORM:

Figure 1.8 (a): Sphere Form

Coding:
Dim r, sa, vol As Single
Private Sub cmdFormulae_Click()
    lblSAF.Caption = "4*Pi*r^2"  lblVF.Caption = "(4/3)*Pi*r^3"
End Sub

Private Sub cmdResult_Click()
r = txtRadius.Text
sa = 4 * (22 / 7) * (r ^ 2)
vol = (4 / 3) * (22 / 7) * (r ^ 3)  txtSA.Text = sa
txtV.Text = vol

txtSA.Text = Round(txtSA.Text, 2)  txtV.Text = Round(txtV.Text, 2)  End Sub

Private Sub Form_Load()
Picture1.Picture = LoadPicture("C:\vbpro\pics\sphere.jpg")  End Sub

IX. CYLINDER FORM:

Figure 1.9(a) Cylinder Form
Figure 1.9(b): Cylinder Diagram

Coding:
Dim r, h, Isa, tsa, v As Integer
Private Sub cmdFormulae_Click()
    Label1.Caption = "2*Pi*r*h"
    Label2.Caption = "2*Pi*r*(r+h)"
    Label3.Caption = "Pi*(r^2)*h"
End Sub
Private Sub cmdResult_Click()
    r = txtR.Text
    h = txtH.Text
    lsa = 2 * (22 / 7) * r * h
    tsa = 2 * (22 / 7) * r * (r + h)
    v = (22 / 7) * (r ^ 2) * h
    txtLSA.Text = lsa
    txtTSA.Text = tsa
    txtV.Text = v
    txtLSA.Text = Round(txtLSA.Text, 2)
    txtTSA.Text = Round(txtTSA.Text, 2)
    txtV.Text = Round(txtV.Text, 2)
End Sub
Private Sub Form_Load()
    Picture1.Picture = LoadPicture("C:\vbpro\pics\cylinder.jpg")
End Sub

X. Cone Form:

Figure 1.10(b) Cone Diagram Coding:

Coding:
Dim r, h, l, csa, tsa, vol As Single
Private Sub cmdFormulae_Click()
    Label1.Caption = "Sqrt(r^2+h^2)"
End Sub
Label2.Caption = "Pi*r*l"
Label3.Caption = "Pi*r*(r+l)"
Label4.Caption = "1/3*Pi*r^2*h"

End Sub

Private Sub Form_Load()
    Picture1.Picture = LoadPicture("C:\vbpro\pics\cone.jpg")
End Sub

Private Sub cmdResult_Click()
    r = txtRadius.Text
    h = txtHeight.Text
    l = Sqr(r ^ 2 + h ^ 2)
    csa = (22 / 7) * r * l
    tsa = csa + ((22 / 7) * (r ^ 2))
    vol = (1 / 3) * (22 / 7) * (r ^ 2) * h
    txtSlantHeight.Text = l
    txtCSA.Text = csa
    txtTSA.Text = tsa
    txtVol.Text = vol
    txtCSA.Text = Round(txtCSA.Text, 2)
    txtTSA.Text = Round(txtTSA.Text, 2)
    txtVol.Text = Round(txtVol.Text, 2)
    txtSlantHeight.Text = Round(txtSlantHeight.Text, 2)
End Sub

XI. CONCLUSION:

This project gave the easy way of explaining area and volume of 3D diagrams to middle or high school students. Children grasp easily through visual aids and learning become easy.

XII. FUTURE WORK:

Generalization of the project is possible in VB 6.0, i.e. you can implement for other topics of mathematics e.g. Profit and Loss problems, Time and Work Problems, Time and Distance Problems and many more.

REFERENCES:

1. VB Black Book
3. Microsoft Visual Basic 6.0
Visual Basic 6.0 Made Easy by Liew Voon Kiong