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

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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 sqroot, username password page, connectivity of various pages etc. Also the functions like date (), time (),windowstate etc. are implemeted 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:

S. No.	Shape	Formulae	Meaning of the terms used
1	Cube	Face Diagonal = $\sqrt{2 * a}$	a = side of the cube
		Body Diagonal = $\sqrt{3 * a}$	
		Surface Area = 6* a^2	
		Volume = a^3	
2	Cuboid	Body Diagonal = $\sqrt{l^2 + b^2 + h^2}$	l = length of the cuboid, b = breadth of the cuboid, h = height of the cuboid
		Surface Area = 2(l∗b +b∗h +h∗l)	
		Volume = l ∗b ∗ h	
3	Sphere	Surface Area = 4 * $\pi * r^2$	π = 3.14 (constant), r = Radius of the Sphere
		Volume = $\frac{4}{3}\pi * r^3$	
4	Cylinder	Lateral Surface Area = 2∗π∗ r∗h	π = 3.14 (constant), r = Radius of base of the cylinder, h = height of the cylinder
		Curved Surface Area = π∗ r∗l	π = 3.14 (constant), r = Radius of base of the cone, h =
		Total Surface Area = π∗ r∗(r + l)	

5	Cone	Volume = $\frac{1}{3}\pi * r^2 * h$	height of the cone, l = slant height of the cone

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 a 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.

Figure 1.1 Start of Visual Basic 6.0

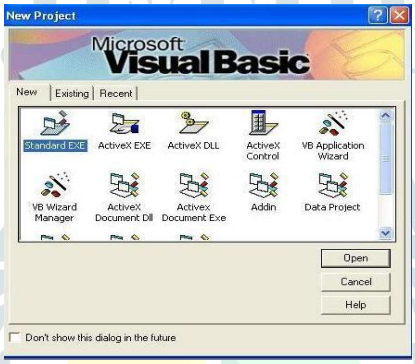

Figure 1.2: Showing Standard EXE

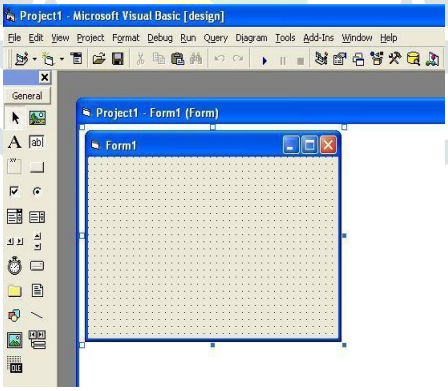

Figure 1.3 (a): Start of the Project from here

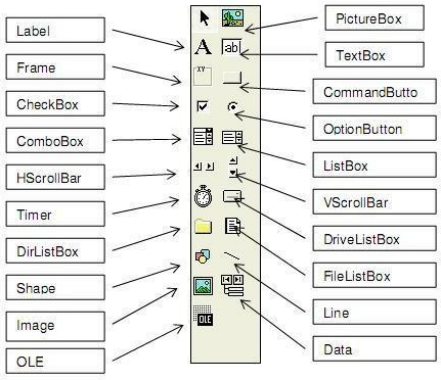

Figure 1.3 (b): Tool Box[4]

IV. USERNAME AND PASSWORD PAGE

Figure 1.4: User Name Password Form

Coding:

```
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:

Figure 1.5: Main Form

Coding:

```
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:

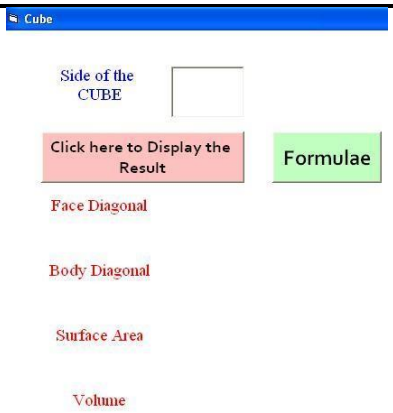

Figure 1.6 (a) Cube Form

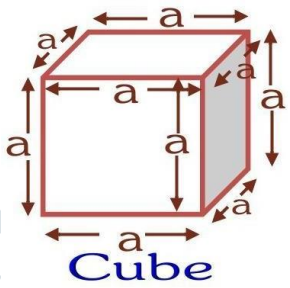

Figure 1.6 (b) Cube Diagram

Coding:

Dim a, fd, bd, sa, v As Single

Private Sub cmdFormulae_Click()

Label1.Caption = "Sqrt(2)*a" Label2.Caption = "Sqrt(3)*a" Label3.Caption = "6*a^2" Label4.Caption = "a^3"

End Sub

Private Sub cmdResult_Click()

a = txtSide.Text fd = Sqr(2) * a bd = Sqr(3) * a sa = 6 * (a ^ 2) v = a ^ 3 txtFD.Text = fd txtBD.Text = bd txtSA.Text = sa txtV.Text = v

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

Private Sub Form_Load()

Picture1.Picture = LoadPicture("C:\vbpro\pics\cube.jpg")

End Sub

VII. CUBOID FORM:

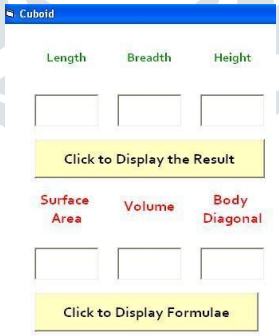

Figure 1.7 (a): Cuboid form

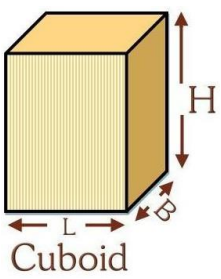

Figure 1.7 (b): Cuboid Diagram

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"

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 = Sqr(l ^ 2 + b ^ 2 + h ^ 2) txtSA.Text = sa
txtV.Text = v 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:

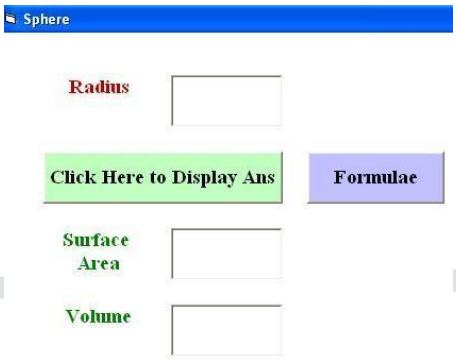

Figure 1.8 (a): Sphere Form

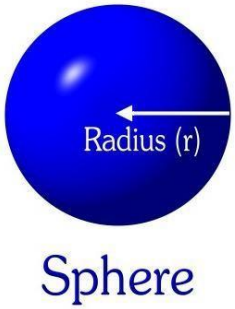

Figure 1.8(b): Sphere Diagram

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:

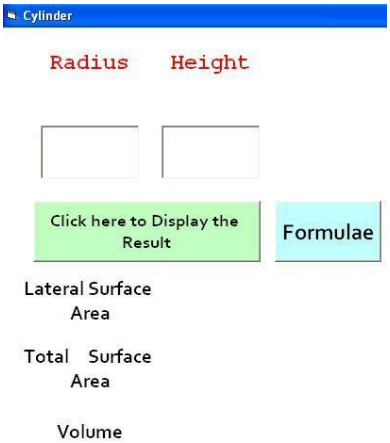

Figure 1.9(a) Cylinder Form

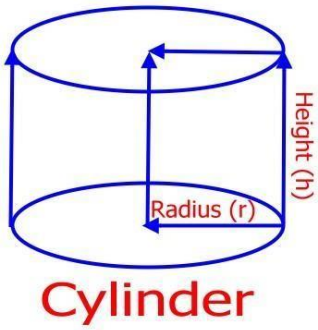

Figure 1.9(b): Cylinder Diagram

Coding:

```
Dim r, h, lsa, 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:

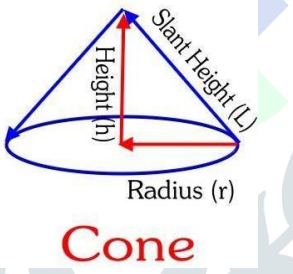

Figure 1.10(b) Cone Diagram Coding:

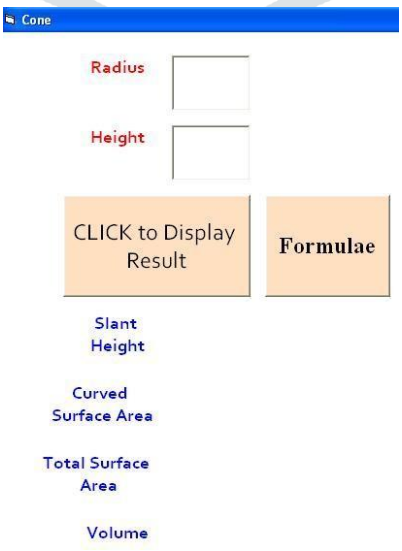

Figure 1.10(a) Cone Form

```
Dim r, h, l, csa, tsa, vol As Single
Private Sub cmdFormulae_Click()
Label1.Caption = "Sqrt(r^2+h^2)"
```

```
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:

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2. Visual Basic Programmimg, Self Instructional Manual for PTU DEP Students of PTU Jallandhar.
3. Microsoft Visual Basic 6.0

Visual Basic 6.0 Made Easy by Liew Voon Kiong