**NANYANG TECHNOLOGICAL**

**UNIVERSITY**

**CZ2003**

**COMPUTER GRAPHICS**

**AND**

**VISUALIZATION**

**Labs Assessment**

**Lab 4: Implicit Solids**

**Report**

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**Task: Building a complex FShape with colors.**

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| **Complex FShape Builded:** Ice Cream Cone Man with Hair  **File Name:** Icecream\_Man | |
| **Left View:**  **C:\Users\mock_\Desktop\Yr 3 Sem 1 Modules\CZ2003 Computer Graphics & Visualisation\Labs\Lab 4\Diagrams\Icecream I.PNG** | **Right View:**  **C:\Users\mock_\Desktop\Yr 3 Sem 1 Modules\CZ2003 Computer Graphics & Visualisation\Labs\Lab 4\Diagrams\Icecream II.PNG** |
| The above diagram shows a complex FShape that resemble an Ice Cream Cone Man with Hair.  It is built by using **1 Ellipsoid**, **1 Cone**, **2 Cylinders** and **3 Spheres**.  The following information will explain how the complex FShape is built.  **Hair:**  The **Hair** is defined by a **Cylinder** shape. To modify the Cylinder shape to make it looks the one shown in the diagram, the following code is used:  cylinder\_hair=min(min((0.5^2-(x/0.5)^2-y^2),-0.5-(z/0.2)),z+1);  **Face:**  An **Ellipsoid** is defined to give the complex FShape a **Face**. The code below shows how the Ellipsoids adjusted to look like a Face.  ellipsoid\_face=min((1-(x/0.5)^2-(y/0.5)^2-(z/0.6)^2),-z);  **Eyes**:  **2** **Sphere** is used to define the **Eyes** for the complex FShape. To set the Eyes correctly, the codes used are as follows:  sphere\_eye=0.08^2-(x-0.45)^2-(y+0.2)^2-(z+0.2)^2;  sphere\_eye2=0.08^2-(x-0.45)^2-(y-0.2)^2-(z+0.2)^2;  **Mouth:**  To make a **Mouth** for the complex FShape, a **Sphere** is used. To modify the sphere so that it can become a Mouth, the following code is used:  sphere\_mouth=0.08^2-(x-0.2)^2-(y-0.2)^2-(z+0.1)^2;  **Body:**  The **Body** of the complex FShape is made up of a **Cone** and the following code is used to define the Body of the complex FShape  cone\_body=min((((z-1)/1)^2-(x/0.6)^2-(y/0.6)^2),z);  **Arm:**  The **Arm** is defined by a **Cylinder** and the code below will show how the Cylinder is being modify to make it an Arm.  cylinder\_arm=min(min((0.05^2-x^2-(z-0.3)^2),y+0.85),0.85-y);  Putting together all the different definition for the different body parts will result in the Ice Cream Cone Man diagram that is seen above.  The codes to combine everything together is as follows:  final=min(min(max(max(max(cone\_body,ellipsoid\_face),cylinder\_hair),cylinder\_arm),-sphere\_eye),-sphere\_eye2);  To obtain the pink-orange color for the complex FShape, the **diffuseColor** has been adjusted to:  r=cos(0.2\*u\*pi); g=0.8\*u; b=sin(0.5\*v\*pi);  Bounding box and Resolution remains the same as follows:  bboxCenter 0 0 0  bboxSize 2 2 2  resolution [100 100 100] | |

**---End of Report---**