King Fahd University of Petroleum and Minerals
Information & Computer Science Department
ICS 103 – Computer Programming in C
Summer Semester 2008 (073)

Lab # 3 (Mathematical Expressions)

Review:
1. Using scanf with multiple inputs
2. Identifying and avoiding common programming errors (page 61 of text book)

Objective:
Learn using operators, expressions and math functions.

Scope:
The student should know the following at the end of this lab:
1. Problem Solving
2. Data Types
3. Arithmetic Expressions (page 84 of text book)
4. Functions definition, concept, arguments, result (page 94 of text book)
5. Math Functions (page 98 of text book)
6. Writing Complete Programs

Discussion:
The following problem will be discussed in the class:
1. Write a program that finds the area of a triangle given the length of its sides: a, b, c.
$$area = \sqrt{s \cdot (s-a) \cdot (s-b) \cdot (s-c)}$$
$$s = \frac{a+b+c}{2}$$

Exercises:
1. Write a program that reads the height **h**, base diameter **b** and cut diameter **d** of the frustum of a cone. The frustum of a cone is formed if the tip is cut off parallel to the base. Frustum shapes occur often on model rockets as fairings between cylindrical sections of the body.
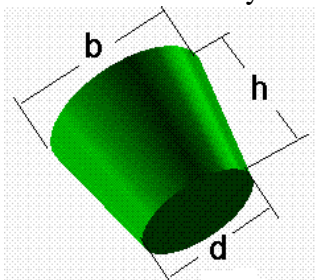
$$V = \frac{\pi h}{12}(d^2 + db + b^2)$$

2. Write a program that reads the volume of a cone with the height **H** and finds the radius of it and the surface area.
$$r = \sqrt{\frac{3V}{\pi H}}$$
$$area = \pi r^2 + \pi r\sqrt{r^2 + h^2}$$

3. Write a program to solve the quadratic equation using quadratic formulas:

$$X1 = \frac{-b + \sqrt{b^2 - 4ac}}{2a} \quad \text{and} \quad X2 = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$

Your Program should prompt the user for the values of a, b and c.

Evaluation:

Your grade will depend on your active participation and seriousness during the lab.