**PA1 Questions**

1. First, write the prototype for a function that will compute the volume of a Right Rectangular Pyramid, The write a C function that will implement the function. To compute the volume of a right rectangular pyramid you can use the formula for the volume, which is V = lwh/3
2. Write a C function that will compute where two lines will intersect. Of the lines have equal slopes, then they will never intersect, so the word “Infinity” must be printed instead of the point of intersection. The point of intersection should be in the form of “The lines will meet at (3,4)”
3. Write a function that will swap the contents of two integer variables.
4. You may think that retirement is too far away to worry about. But, what would happen if you put $10,000 in a bank account and left it there for the next 40 years or so. How much money would you have? Well, we can compute the Future Value of Money using the formula FV = PV(1 + i/r)r \* t

Where FV is the future value, PV is the present value, i is the interest rate, r is the number of times compounded per year, and t is the number of years. Write a C program that will allow someone to compute this, or any other, such investment.

1. An aircraft's lift capabilities can be measured from the following formula: L = (1/2) d v2 s CL where

L = Lift, which must equal the airplane's weight in pounds

d = density of the air. This will change due to altitude. These values can be found in a I.C.A.O. Standard Atmosphere Table.

v = velocity of an aircraft expressed in feet per second

s = the wing area of an aircraft in square feet

CL = Coefficient of lift , which is determined by the type of airfoil and angle of attack.

Write a C program that will ask for the aforementioned values and then display the lift expected.

1. According to the National Institutes of Health (NIH): A BMI of less than 18.5 means that a person is underweight. A BMI of between 18.5 and 24.9 is ideal. A BMI of between 25 and 29.9 is overweight. Write a C program that will classify an individual into Underweight, Ideal, or Overweight based upon their BMI. BMI is calculated by the formular BMI = 703 x weight (lbs) / [height (in)]2
2. According to [Math Central at the University of Regina in Canada,](http://mathcentral.uregina.ca/QQ/database/QQ.09.02/shirley3.html) a “rule-of-thumb” for line of sight calculations, where the distance is small in comparison to the size of the earth is c = 2x2/3, where c is the distance until the curvature of the Earth would impact a line-of-sight based project. At 450 to 465 MHz, radio frequencies used by both the military (for certain radar applications) and public safety agencies (for communications), line-of-sight is all that can be expected for an accurate radio transmission. Write a C program that, when given the altitude of an antenna, will determine the maximum reliable transmission distance for radios in the 450 to 465 MHz radio band.
3. The basic unit of computer memory is a bit. A bit can represent two values (on or off, 0 or 1). To represent more information, bits are grouped together in larger quantities. Beyond a bit, the next logical grouping is a byte, where 1 byte has 8 bits. Write a C program that prompts the user for a number of bits and then outputs the equivalent number of bytes.
4. Write a C program that prompts the user for an image width and height and the number of bits per pixel and, if the file size is greater than 1 GB, outputs the file size in gigabytes; otherwise it outputs the size in MB.
5. In photography, the Depth of Field (DOF) is the distance in which the subject of a photograph is in focus. Anything outside of the DOF is blurred. To assist a “newbie” photographer in calculating the f-stop (i.e. the inside diameter of the lens) that will yield a desired “in focus” range, write a C program that will implement the following formula: f = (2DnDf)/(Dn + Df), where f is the best f-stop, Dn is the near distance,and Df is the far distance for the “in focus” range.
6. The Electromagnetic Pulse (EMP) “effective distance” can be loosely modeled as a “line-of-sight” calculation. According to [Math Central at the University of Regina in Canada,](http://mathcentral.uregina.ca/QQ/database/QQ.09.02/shirley3.html) a “rule-of-thumb” for line of sight calculations, where the distance is small in comparison to the size of the earth is c = 2x2/3, where c is the distance until the curvature of the Earth would impact a line-of-sight based project. Write a C program that will, based upon the distance from the center of an “EMP event,” that will calculate the required altitude to impact all electronics at that distance from the center of the “event.”
7. All objects fall to Earth at the same rate. Given the muzzle velocity of a bullet, calculate how far the bullet will travel until it hits the ground if the rifle is held parallel to the Earth. Distance of travel horizontally is calculated by d = vt, where d is distance, v is velocity, and t is time. The time that an object takes to fall from a given height can be calculated from d = gt2/2. Where g is the acceleration due to gravity (32ft/sec2 and t is the time in seconds. Write a C program that will calculate the distance a bullet will fly when the rifle is held a given distance about the ground.