Basic Programs

a) Ramesh's basic salary in input through the keyboard his dearness Allowance is 40% of basic salary, and house rent allowance is 20% of basic salary. Write a program to calculate his gross salary.

b) The distance between two cities (in km.) is input through the keyboard. Write a program to convert and print this distance in meters, feet, inches and centimeters.

c) If the marks obtained by a student in five different subjects are input through the keyboard, write a program to find out the aggregate marks and percentage marks obtained by the student. Assume that the maximum marks that can be obtained by a student in each subject is 100.

d) Temperature of a city in Fahrenheit degrees is input through the keyboard. Write a program to convert this temperature into centigrade degrees.

e) The length and breadth of a rectangle and radius of a circle are input through the keyboard. Write a program to calculate the area and perimeter of the rectangle, and the area and circumference of the circle.

f) Paper of size A0 has dimensions 1189 mm x 841 mm. Each subsequent size A (n) is defined as A (n-1) cut in half parallel to its shorter sides. thus paper of size A1 would have dimensions 841 mm x 594 mm. Write a program to calculate and print paper sizes A0,A1,A2,……A8.

g) If a five-digit number is input through the keyboard, write a program to calculate the sum of its digits. (Hint: Use the modulus operator '%')

h) If a five-digit number is input through the keyboard, write a program to reverse the number.

i) If lengths of three sides of a triangle are input through the keyboard, write a program to find the area of the triangle.

j) Write a program to receive Cartesian co-ordinates (x, y) of a point and convert them into polar co-ordinates (r, ϕ).
Hint: $r = \text{sqrt}(x^2 + y^2)$ and $\phi = \tan^{-1}(y/x)$.

k) Write a program to receive values of latitude (L1, L2) and longitude (G1, G2), in degrees, of two places on the earth and output the distance (D) between them in nautical miles. The formula for distance in nautical miles is:
$D = 3963 \cos^{-1}(\sin L1 + \sin L2 + \cos L1 \cos L2 * \cos(G2-G1))$

l) Wind chill factor is the felt air temperature on exposed skin due to wind. The wind chill temperature is always lower then the air temperature, and is calculated as per the following formula:
$wcf = 35.74+0.6215t+(0.4275t-35.75)*v^{0.16}$
where t is the temperature and v is the wind velocity. Write a program to receive values of t and v and calculated wind chill factor (wcf).

m) If value of an angle is input through the keyboard, write a program to print all its Trigonometric ratios.

n) Two numbers are input through the keyboard into two locations C and D. Write a program to interchange the contents of C and D.

o) Two numbers are input through the keyboard into two locations C and D. Write a program to interchange the contents of C and D without using third variable.

p) Two numbers are input through the keyboard into two locations C and D. Write a program to interchange the contents of C and D without using third variable and without using arithmetic operator.

q) Consider a currency system in which there are notes of seven denominations, namely, Re.1, Rs.2, Rs.5, Rs.10, Rs.50, Rs.100. If a sum of Rs. N is entered through the keyboard, write a program to compute the smallest number of notes that will combine to give Rs. N.