- (a) Write a program to print all prime numbers from 1 to 300.
 - (Hint: Use nested loops, break and continue)

- (b) Write a program to fill the entire screen with a smiling face. The smiling face has an ASCII value 1.
- (c) Write a program to add first seven terms of the following series using a for loop:

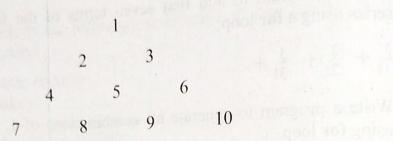
$$\frac{1}{1!} + \frac{2}{2!} + \frac{3}{3!} + \dots$$

- (d) Write a program to generate all combinations of 1, 2 and 3 using for loop.
- (e) A machine is purchased which will produce earning of Rs. 1000 per year while it lasts. The machine costs Rs. 6000 and will have a salvage value of Rs. 2000 when it is condemned. If 9 percent per annum can be earned on alternate investments, write a program to determine what will be the minimum life of the machine to make it a more attractive investment compared to alternative investment?
- (f) Write a program to print the multiplication table of the number entered by the user. The table should get displayed in the following form:

(g) Write a program to produce the following output:

A	B	C	D	E	F	G	F	E	D	C	В	A
A	В	Ç	D	E	F		F	E	D	C	В	A
A	В	C	D	E				E	D	C	В	A
A	В	C	D						D	C	В	A
A	В	C								C	В	A
A											В	A
A												A

(h) Write a program to produce the following output:



(i) Write a program to produce the following output:

(j) According to a study, the approximate level of intelligence of a person can be calculated using the following formula:

$$i = 2 + (y + 0.5x)$$

Write a program that will produce a table of values of **i**, **y** and **x**, where **y** varies from 1 to 6, and, for each value of **y**, **x** varies from 5.5 to 12.5 in steps of 0.5.

(k) When interest compounds q times per year at an annual rate of r % for n years, the principal p compounds to an amount a as per the following formula

$$a = p(1+r/q)^{nq}$$

Write a program to read 10 sets of **p**, **r**, **n** & **q** and calculate the corresponding **a**s.

(1) The natural logarithm can be approximated by the following series.

$$\frac{x-1}{x} + \frac{1}{2} \left(\frac{x-1}{x}\right)^2 + \frac{1}{2} \left(\frac{x-1}{x}\right)^3 + \frac{1}{2} \left(\frac{x-1}{x}\right)^4 + \dots$$

If x is input through the keyboard, write a program to calculate the sum of first seven terms of this series.

- (m) Write a program to generate all Pythogorean Triplets with side length less than or equal to 30.
- (n) Population of a town today is 100000. The population has increased steadily at the rate of 10 % per year for last 10 years. Write a program to determine the population at the end of each year in the last decade.
- (o) Ramanujan number is the smallest number that can be expressed as sum of two cubes in two different ways. Write a program to print all such numbers up to a reasonable limit.
- (p) Write a program to print 24 hours of day with suitable suffixes like AM, PM, Noon and Midnight.
- (q) If Loan amount, Number of months and Rate of Interest are entered through the keyboard, write a program to calculate the monthly installment (including contribution towards Principal and Interest) for each month of loan duration.