Structure

1. Define “typedef struct {float re, im} complex”. Using it define “complex power(complex a, int n)” to find n-th power of a complex number.
   Input: 1+i and 3 Output: -2+ 2i
   Input: 1+i and 2 Output: 0+ 2i

2. Define vector as “typedef struct {float i, j, k} vector”. Use it to find “float dotproduct(vector a, vector b)”, “float crossproduct (vector a, vector b)”.
   The dot product of two vectors a = (a_1,a_2,a_3) and b = (b_1, b_2,b_3) is defined as: $\mathbf{a.b=a_1b_1+a_2b_2+a_3b_3}$
   and their cross product is given by $\mathbf{a\times b=(a_2b_3-a_3b_2,\ a_3b_1-a_1b_3,\ a_1b_2-a_2b_1).}$
   Input: (2,3,1), (5,2,3) Output 19, (7,-1,-11).
   Input: (2,-3,1), (-5,2,-3) Output -19, (7,1,-11).

3. Program to read 3 vector and output (a×b).c.
   Input: a= (2,3,5), b= (4,2,3), c= (-2,5,3) Output : 48
   Input: a= (2,3,1), b= (1,2,3), c= (-2,5,3) Output : -36

4. Write a program to add 2 polynomials with complex coefficient.
   Input: $P(x)= (1+i)x^2+(2-3i)x+(1+7i)$, $Q(x)=(1-3i)x+(1-7i)$
   Output: $R(x)= (1+i)x^2+(3-6i)x+(2+0i)$
   Input: $P(x)= (1+i)x^2+(2-3i)x+(1+7i)$, $Q(x)=(1-i)x^2+(1-3i)x+(1-7i)$
   Output: $R(x)= (2+0i)x^2+(3-6i)x+(2+0i)$
   Note: To give a polynomial as input it is required to give the co-efficient.

5. Write a program to find the root of a quadratic equation with **complex coefficient.**
   Input: a=1+0i, b=-13-12i, c=13+87i Output: 8+3i, 5+9i
   Input: a=1+0i, b=9+0i, c=9+0i Output: -3+0i,-3+0i

String

1. Find biggest letter (letter with highest ASCII value).
   Input: ramesh Output: s
   Input: sachin Output: s

2. Read 2 strings and join them (second string first).
   Input: ram hari Output: hariram
   Input: sachin sourav Output: souravsachin

3. Write a program to delete 2^{nd} word.
   Input: sachin ramesh tendulkar Output: sachin tendulkar
   Input: we are fighting with corona Output: we fighting with corona

4. Read a string and delete repeated words.

Input: we are are fighting with corona Output: we are fighting with corona
Input: we are fighting with corona Output: we are fighting with corona

5. Read n strings and find lexicographically biggest string.
   Input: n=4, hari ram kapil akhya Output: ram
   Input: n=3, ram rahim rahul Output: ram

6. Read 2 string of same size and shuffle them.
   Input: abhy gopi Output: agbohpyi
   Input: ram das Output: rdaams

Pointer

1. Define "void swap(int *x, int *y)" to swap two elements.
   Input: a=3, b=5 Output: a=5, b=3
   Input: a=30, b=55 Output: a=55, b=30

2. Define a function "void surf-vol(int a, float *S, float *V)". Use this to find surface area and volume of a cube.
   Input: 5 Output 150,125
   Input: 6 Output 216,216

3. Define a function "float variance(float *A, int SIZE)". Use this to find variance of n element in the array A[].
   Mean m=sum/n, Varience =(sum of squares)/n $-m^2$.
   Input: 4,2,5,5,2 and 5 Output: 1.84
   Input: 4,2,5,2 and 4 Output: 1.6875

4. Define a function "void multiply (complex *a, complex *b, complex *c)". Use this to find product of 2 complex number. Use "typedef struct {float re, im} complex" to define complex.
   Input: 1+2i, 3+4i Output: −5+10i
   Input: 2−i, 3+i Output: 7−i

5. Define "void MinMax(int A[], int n, int *min, int *max)" to find maximum and minimum of an array of size n.
   Input: n=5; 4,8,1,5,4 Output: min=1, max=8
   Input: n=4; 4,3,1,5 Output: min=1, max=5