The output of the C++ code for:
Exercise 4:

1)

```
Please enter the number of rows (m) &
    columns (n) of your matrix
4 2
Enter your matrix cells row by row
1 0
0 0
1 1
1 2
The inner product will be in the form:
    ((u1, u2, .. , un), (v1, v2, .. ,
    vn)) = a1u1v1 + a2u2v2 + .... +
    anvnun
Please enter the weights: a1, a2, ... ,
    an
1 1 1 1

Vector Q:
The matrix now:
      1      -1
      0       0
      1       0
      1       1

Q after Normalization The matrix now:
 0.5774 -0.7071
      0       0
 0.5774       0
 0.5774  0.7071

Vector R:
The matrix now:
  1.732   1.732
      0   1.414
```

2)

```
Please enter the number of rows (m) &
    columns (n) of your matrix
3 3
Enter your matrix cells row by row
1 0 0
1 1 0
1 1 1
The inner product will be in the form:
    ((u1, u2, .. , un), (v1, v2, .. ,
    vn)) = a1u1v1 + a2u2v2 + .... +
    anvnun
Please enter the weights: a1, a2, ... ,
    an
1 1 1

Vector Q:
The matrix now:
      1 -0.6667       0
      1  0.3333    -0.5
      1  0.3333     0.5

Q after Normalization The matrix now:
 0.5774 -0.8165       0
 0.5774  0.4082 -0.7071
 0.5774  0.4082  0.7071

Vector R:
The matrix now:
  1.732   1.155  0.5774
      0  0.8165  0.4082
      0       0  0.7071
```

3)

```
Please enter the number of rows (m) &
    columns (n) of your matrix
4 3
Enter your matrix cells row by row
1 0 -1
1 2 0
1 2 0
1 0 0
The inner product will be in the form:
    ((u1, u2, .. , un), (v1, v2, .. ,
    vn)) = a1u1v1 + a2u2v2 + .... +
    anvnun
Please enter the weights: a1, a2, ... ,
    an
1 1 1 1

Vector Q:
The matrix now:
      1      -1    -0.5
      1       1       0
      1       1       0
      1      -1     0.5

Q after Normalization The matrix now:
    0.5    -0.5 -0.7071
    0.5     0.5       0
    0.5     0.5       0
    0.5    -0.5  0.7071

Vector R:
The matrix now:
      2       2    -0.5
      0       2     0.5
      0       0  0.7071
```

Exercise 5:

1)

```
Please enter the number of rows (m) &
    columns (n) of your matrix
4 2
Enter your matrix cells row by row
1 0
0 0
1 1
1 2
The inner product will be in the form:
    ((u1, u2, .. , un), (v1, v2, .. ,
    vn)) = a1u1v1 + a2u2v2 + .... +
    anvnun
Please enter the weights: a1, a2, ... ,
    an
5 1 3 1

Vector Q:
The matrix now:
      1 -0.5556
      0       0
      1  0.4444
      1   1.444

Q after Normalization The matrix now:
 0.3333 -0.2704
      0       0
 0.3333  0.2163
 0.3333   0.703

Vector R:
The matrix now:
      3   1.667
      0   2.055
```

2)

```
Please enter the number of rows (m) &
    columns (n) of your matrix
3 3
Enter your matrix cells row by row
1 0 0
1 1 0
1 1 1
The inner product will be in the form:
    ((u1, u2, .. , un), (v1, v2, .. ,
    vn)) = a1u1v1 + a2u2v2 + .... +
    anvnun
Please enter the weights: a1, a2, ... ,
    an
5 1 3

Vector Q:
The matrix now:
      1 -0.4444       0
      1  0.5556   -0.75
      1  0.5556    0.25

Q after Normalization The matrix now:
 0.3333 -0.2981       0
 0.3333  0.3727  -0.866
 0.3333  0.3727  0.2887

Vector R:
The matrix now:
      3   1.333       1
      0   1.491   1.118
      0       0   0.866
```

3)

```
Please enter the number of rows (m) &
    columns (n) of your matrix
4 3
Enter your matrix cells row by row
1 0 -1
1 2 0
1 2 0
1 0 0
The inner product will be in the form:
    ((u1, u2, .. , un), (v1, v2, .. ,
    vn)) = a1u1v1 + a2u2v2 + .... +
    anvnun
Please enter the weights: a1, a2, ... ,
    an
5 1 3 1

Vector Q:
The matrix now:
      1    -0.8 -0.1667
      1     1.2 5.551e-17
      1     1.2 5.551e-17
      1    -0.8  0.8333

Q after Normalization The matrix now:
 0.3162 -0.2582 -0.1826
 0.3162  0.3873 6.081e-17
 0.3162  0.3873 6.081e-17
 0.3162 -0.2582  0.9129

Vector R:
The matrix now:
  3.162    2.53  -1.581
      0   3.098   1.291
      0       0  0.9129
```