```c
#include <stdio.h>
#include <math.h>

void normalize(float* vector);

/* project of (vector A) onto (vector B) */
float* orthogonalize(float* project_of, float* project_onto);

 /* if dot product of two vector is zero == two vectors are orthogonal */
void dot_prod(float* a, float* b);

int main(){

    float a[3]; // two 3-dim vector
    float b[3];
    float* c; // for orthogonalized vector of b

    printf("enter the first vector(sep : space)\n");
    scanf("%f %f %f", &a[0], &a[1], &a[2]);

    printf("enter the second vector(sep : space)\n");
    scanf("%f %f %f", &b[0], &b[1], &b[2]);

    if((a[0] == 0 && a[1] == 0 && a[2]==0) || (b[0] == 0 && b[1]==0 && b[2]==0)){
        printf("You have zero-vector in the system.\n");
        return 0;
    }

    printf("\n---- Original Vectors ----\n\n");
    printf("   A      B\n");
    for(int i = 0; i<3; i++)
        printf("%4.1f    %4.1f\n", a[i], b[i]); // print two vectors

    c = orthogonalize(b, a); // orthogonize vector

    printf("\n---- After Orthogonize ----\n\n");
    printf("   A       C\n");
    for(int i = 0; i<3; i++)
        printf("%6.3f   %6.3f\n", a[i], c[i]);
    dot_prod(a, b);

    normalize(c); // normalize vector c
    normalize(a); // normalize vector a

    printf("\n---- After Orthonormalize ----\n\n");
    printf("   A       C\n");
    for(int i = 0; i<3; i++)
        printf("%6.3f   %6.3f\n", a[i], c[i]);
```

```c
    dot_prod(a, c);

    printf("\n\n");
    return 0;
}

void normalize(float* vector){

    float length = 0;
    for(int i = 0; i<3; i++){
        length += pow(vector[i],2);
    }
    length = sqrt(length);
    if(length != 1){
        for(int i = 0; i<3; i++){
            vector[i] /= length;
        }
    }
}

float* orthogonalize(float* project_of, float* project_onto){

    float numerator = 0, denominator = 0;
    float dot_prod = 0;

    for(int i = 0; i<3; i++){
        dot_prod += project_of[i] * project_onto[i];
    }

    if(dot_prod == 0)
        return project_of;


    for(int i = 0; i<3; i++){
        denominator += pow(project_onto[i], 2);
        numerator += project_of[i] * project_onto[i];
    }

    for(int i = 0; i<3; i++){
        project_of[i] -= (numerator / denominator) * project_onto[i];
    }

    return project_of;
}

void dot_prod(float* a, float* b){
    float sum = 0;
    for(int i = 0; i<3; i++){
        sum += a[i] * b[i];
```

```
    }
    printf("dot product of two vecter is : %f \n", sum);
}
```