Alex Klein Project C Tests

Test 1: Check C and T vectors in rectangle

Called graphene(10,0,10)

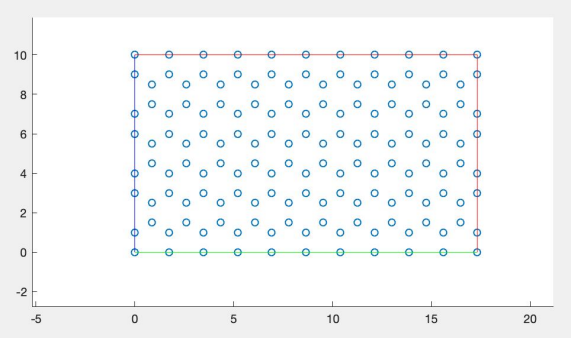
with the additional code:

```
figure (1);
hold on

%plot atoms
plot(pos(1,:), pos(2,:), 'o') ;

% plot vector C
plot( [ 0 , C(1,1) ] , [ 0 , C(2,1) ] , 'g' ) ;

% plot vector T
plot( [ 0 , T(1,1) ] , [ 0 , T(2,1) ] , 'b' ) ;

% plot the rest of the polygon
plot( [ C(1,1) , T(1,1) + C(1,1) ] , [ C(2,1) , T(2,1) + C(2,1) ] , 'r' ) ;
plot( [ T(1,1) , T(1,1) + C(1,1) ] , [ T(2,1) , T(2,1) + C(2,1) ] , 'r' ) ;

hold off
```

Vectors:

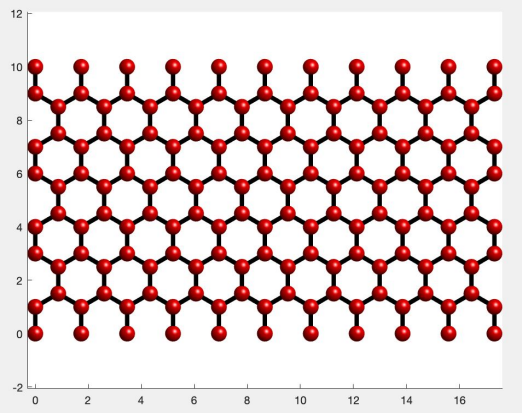
- C is green
- T is blue
- Red is the other edges of the polygon

Plot output:



Check: points are correctly positioned within the rectangle

Atomplot output:



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Test 2: Check C and T vectors in polygon

Called graphene(10,4,20)

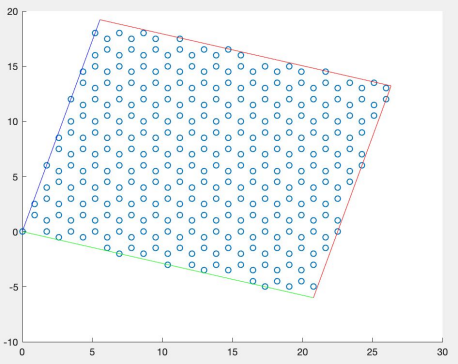
with the additional code:

```
figure (1);
hold on

%plot atoms
plot(pos(1,:), pos(2,:), 'o') ;

% plot vector C
plot( [ 0 , C(1,1) ] , [ 0 , C(2,1) ] , 'g' ) ;

% plot vector T
plot( [ 0 , T(1,1) ] , [ 0 , T(2,1) ] , 'b' ) ;

% plot the rest of the polygon
plot( [ C(1,1) , T(1,1) + C(1,1) ] , [ C(2,1) , T(2,1) + C(2,1) ] , 'r' ) ;
plot( [ T(1,1) , T(1,1) + C(1,1) ] , [ T(2,1) , T(2,1) + C(2,1) ] , 'r' ) ;

hold off
```

Vectors:

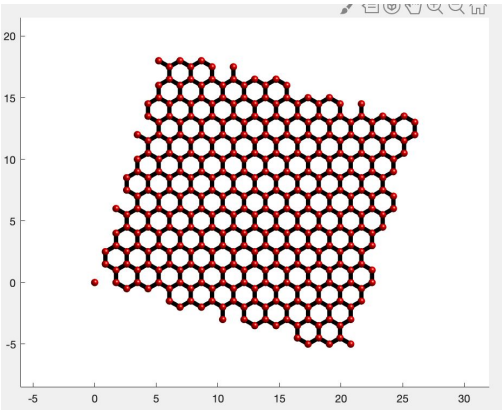
- C is green
- T is blue
- Red is the other edges of the polygon

Plot output:



Check: points are correctly positioned within the polygon

Atomplot output:



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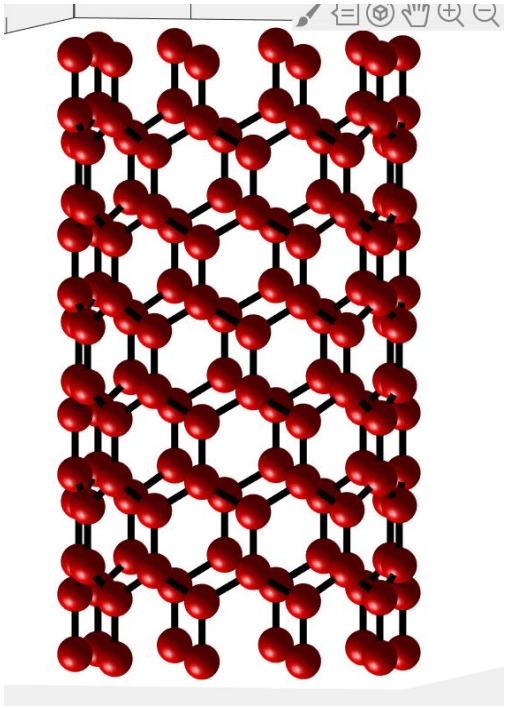
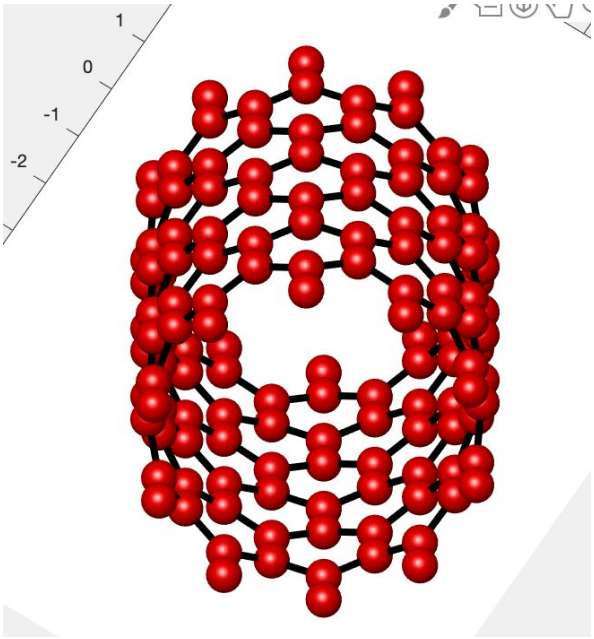
Test 3: nanotube(10,0,10)





Checks:

- All atoms correctly connected by atomplot function
- 10 times 6 ring carbon loops around the tube
- Len vector 10 is proper distance

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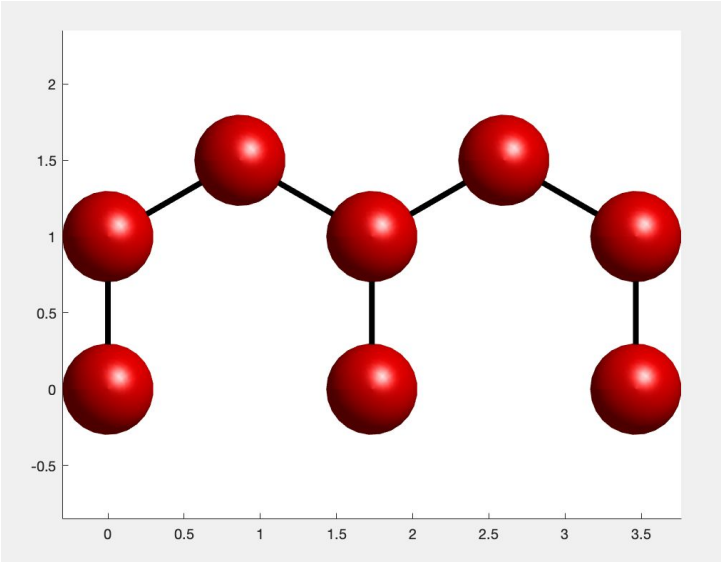
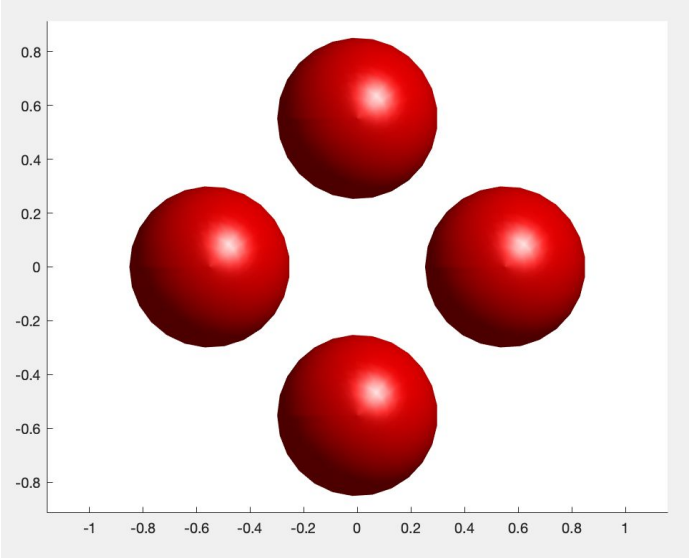
Test 4: (2,0,2)

```
>> Graphene(2,0,2)

ans =

         0         0         0
         0    1.0000         0
    0.8660    1.5000         0
    1.7321         0         0
    1.7321    1.0000         0
    2.5981    1.5000         0
    3.4641         0         0
    3.4641    1.0000         0
```




```
>> Nanotube(2,0,2)

ans =

    0.0000    0.5513    1.5000
   -0.5513    0.0000         0
   -0.5513    0.0000    1.0000
   -0.0000   -0.5513    1.5000
    0.5513   -0.0000         0
    0.5513   -0.0000    1.0000
```



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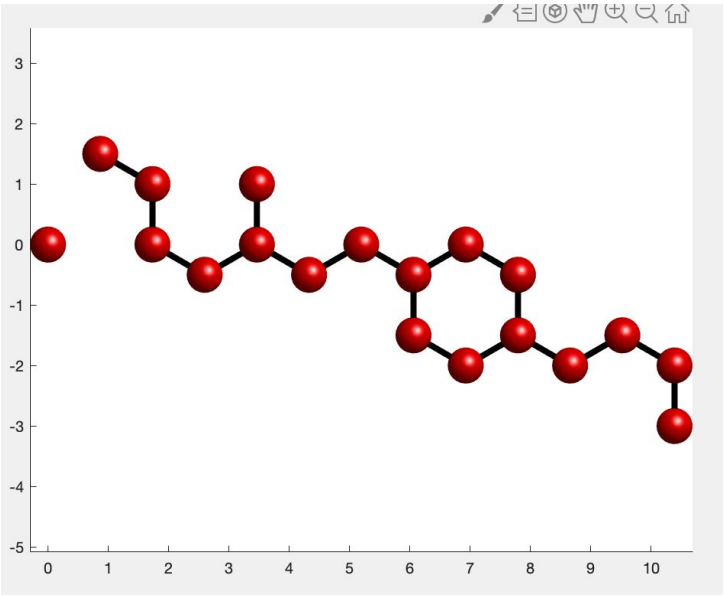
Test 5: (5,2,2)

```
>> Graphene(5,2,2)

ans =

         0         0         0
    0.8660    1.5000         0
    1.7321         0         0
    1.7321    1.0000         0
    2.5981   -0.5000         0
    3.4641         0         0
    3.4641    1.0000         0
    4.3301   -0.5000         0
    5.1962         0         0
    6.0622   -1.5000         0
    6.0622   -0.5000         0
    6.9282   -2.0000         0
    6.9282         0         0
    7.7942   -1.5000         0
    7.7942   -0.5000         0
    8.6603   -2.0000         0
    9.5263   -1.5000         0
   10.3923   -3.0000         0
   10.3923   -2.0000         0
```




```
>> Nanotube(5,2,2)

ans =

    0.9779    1.4168    0.4804
    1.1925    1.2416    1.4412
    0.0693    1.7201    0.2402
   -0.6105    1.6097    0.9608
   -0.3443    1.6867    1.9215
   -1.3763    1.0342    0.7206
   -1.6715    0.4120    1.4412
   -1.5243   -0.8000    0.2402
   -1.6329   -0.5452    1.2010
   -0.8608   -1.4909    0.0000
   -1.2886   -1.1416    1.9215
   -0.2075   -1.7090    0.7206
   -0.4790   -1.6536    1.6813
    0.7380   -1.5553    0.4804
    1.2886   -1.1416    1.2010
    1.7215    0.0000    0.0000
    1.6992   -0.2762    0.9608
```