SHUBHAM WARE

M.Nr2211211
Ware.shubham@st.ovgu.de

FOLLOWING IS MAIN LOOP USED IN PROGRAM

POSITION UPDATES FOR PARTICLE

```
x1_update=x1+v1_update.*del_t;
x1=x1_update;

x2_update=x2+v2_update.*del_t;
x2=x2_update;
```

CALULATING OVERLAP OF PARTICLES

```
overlap_update=overlap(x1_update,x2_update,d1,d2);
del_overlap=overlap_update-overlp;
overlp=overlap_update;
```

CONDITION FOR LOADING AND UNLOADING COEFF OF RESTITUTION

```
if del_overlap>=0
    force= -kl*overlap_update*norm_unit_vector(x1_update,x2_update);
    else
    force= -kun*overlap_update*norm_unit_vector(x1_update,x2_update);
end
```

UPDATE VELOCITY FOR NEW FORCE CALULATED

```
v2_update=v2_update+0.5*(force/m)*del_t;
```

CALULATING KINETIC ENERGY FOR PARTICLE 2

```
KE(j)=kinetic_energy(m,v2_update);
```

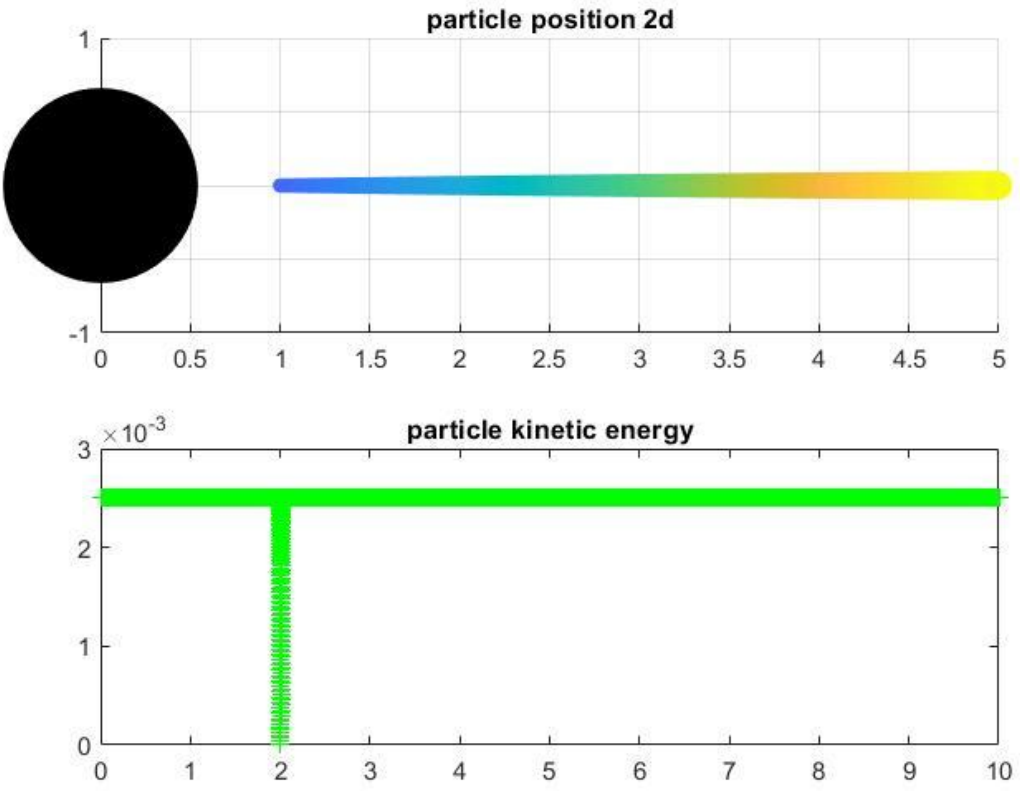
ANSWERS

1.

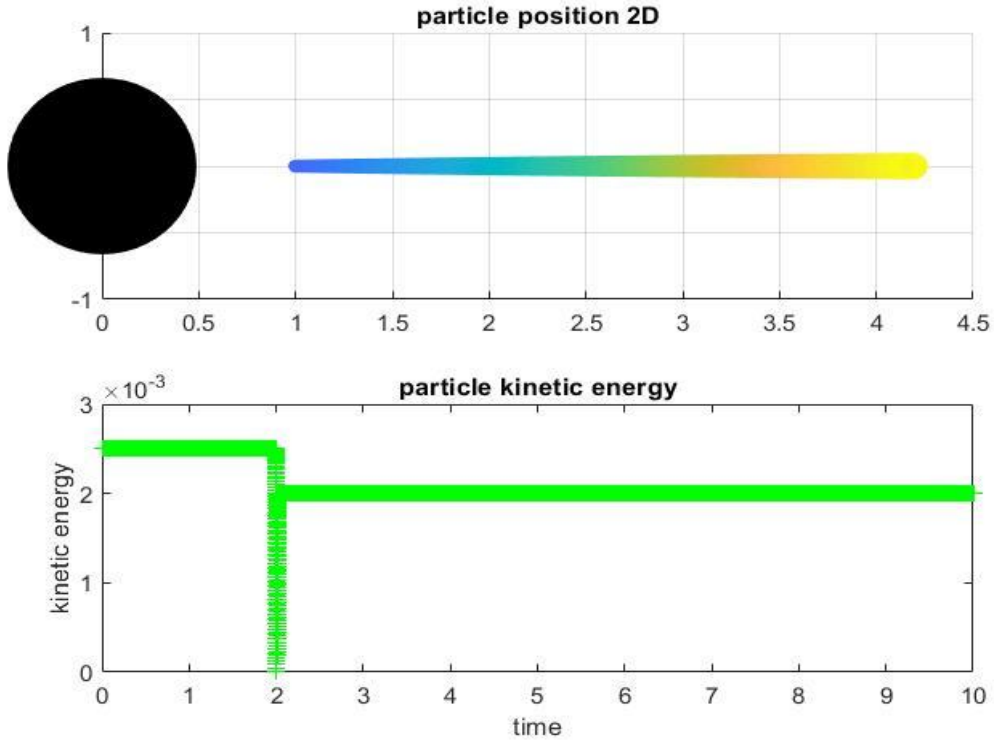
```
Radius_sum=d1/2+d2/2;
if R12>= Radius_sum
   sigma=0;
else
sigma=(Radius_sum)-R12;
end
```

2. leapfrog

3&4. PARTCILE POSITION WITH LINEAR MODEL



Fig(1.1)particle position and kinetic energy



5.

Fig(1.2)particle position and kinetic energy for 0.8 coeff of restitution

CONCLUSION:

1. By looking at two different plots for linear model and one with coeff. of restitution we could easily see that kinetic energy is lost in the process of Collison.
2. By making time step more finer we get more better results; but in this case time step 0.01 was found to be efficient and viable.
3. Additionally I also changed the mass of the 2nd particle and found that with a mass of 100 kg second particle goes even further near to 1st object, proving change in movement conservation for the algorithm.