```
    1: #include <iostream>
    2: #include <vector>
    3: #include <SFML/System.hpp>
    4: #include <SFML/Window.hpp>
    5: #include <SFML/Graphics.hpp>
    6: #include <SFML/Audio.hpp>
    7: #include <memory>
    8: using namespace std;
    9: using namespace sf;
   10:
   11:
   12: class bodies : public sf::Drawable{
   13: public:
   14:         bodies();
   15:         sf::Sprite sprite;
   16:         //bodies(double xpossition, double ypossition, double xvelocity, dou
ble yvelocity, double size, std::string imagename);//construcot
   17:         friend std::istream& operator>> (std::istream &in, bodies& body){//i
nsertion for taking the data from inputfiles
   18:         in >> body.xpos;
   19:         in >> body.ypos;
   20:         in >> body.xvel;
   21:         in >> body.yvel;
   22:         in >> body.mass;
   23:         in >> body.filename;
   24:         body.Fx = 0;
   25:         body.Fy = 0;
   26:         return in;
   27:         }
   28:         void virtual draw(sf::RenderTarget& target, sf::RenderStates blend)
const;
   29:         void createBody(double rad, int universe_size);
   30:         double getxpos(){
   31:                 return xpos;
   32:         }
   33:         double getypos(){
   34:                 return ypos;
   35:         }
   36:         double getxvel(){
   37:                 return xvel;
   38:         }
   39:         double getyvel(){
   40:                 return yvel;
   41:         }
   42:         double getmass(){
   43:                 return mass;
   44:         }
   45:
   46:         double getFx(){
   47:                 return Fx;
   48:         }
   49:         double getFy(){
   50:                 return Fy;
   51:         }
   52:
   53:         void setxpos(double x){
   54:                 xpos = x;
   55:                 return;
   56:         }
   57:         void setypos(double y){
   58:                 ypos = y;
```

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    59:                 return;
    60:         }
    61:         void setxvel(double x){
    62:                 xvel = x;
    63:                 return;
    64:         }
    65:         void setyvel(double y){
    66:                 yvel = y;
    67:                 return;
    68:         }
    69:         void setspritePos(double x, double y){
    70:                 sprite.setPosition(sf::Vector2f(x, y));
    71:                 return;
    72:         }
    73:         void setFx(double x){
    74:                 Fx = x;
    75:                 return;
    76:         }
    77:         void setFy(double y){
    78:                 Fy = y;
    79:                 return;
    80:         }
    81: private:
    82:         double xpos;
    83:         double ypos;
    84:         double xvel;
    85:         double yvel;
    86:         double mass;
    87:         std::string filename;
    88:         Texture texture;
    89:         //sf::Sprite sprite;
    90:         double Fx;
    91:         double Fy;
    92: };
    93:
    94:
    95:
    96:
    97: class universe : public bodies{
    98: public:
    99:         universe();
   100:         void addBody(unique_ptr<bodies> body);
   101:         void draw_universe(RenderWindow &window);
   102:         void update();
   103:         void travel(double rad, int universe_size);
   104: private:
   105:         vector <unique_ptr<bodies>> solarSystem;
   106:
   107: };
   108:
```