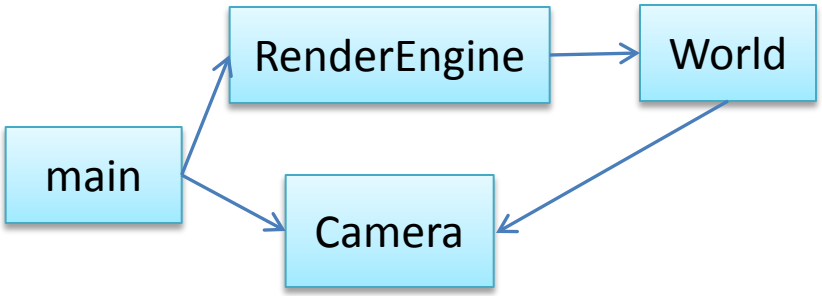
The Ray Tracer Code

CS-445

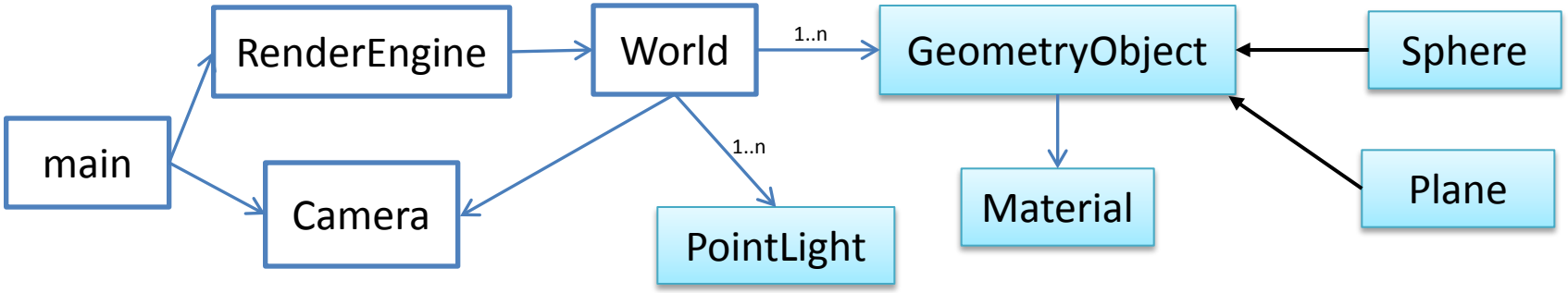
Main Components

- **`main`** - Starting point of program
  - Contains the GLUT windowing commands
  - Contains pointers to Objects:
    - **`Camera`**
    - **`RenderEngine`**
- **`RenderEngine`** class– *performs the rendering calculations!!*
  - Has pointer to the **`World`**
- **`Camera`** –
  - Location & orientation (uvn), resolution, viewplane size & location
- **`World`** - hold the assets of the scene:
  - **`Camera`**, List of shapes, list of lights
  - Pointer to the image array



Scene Assets

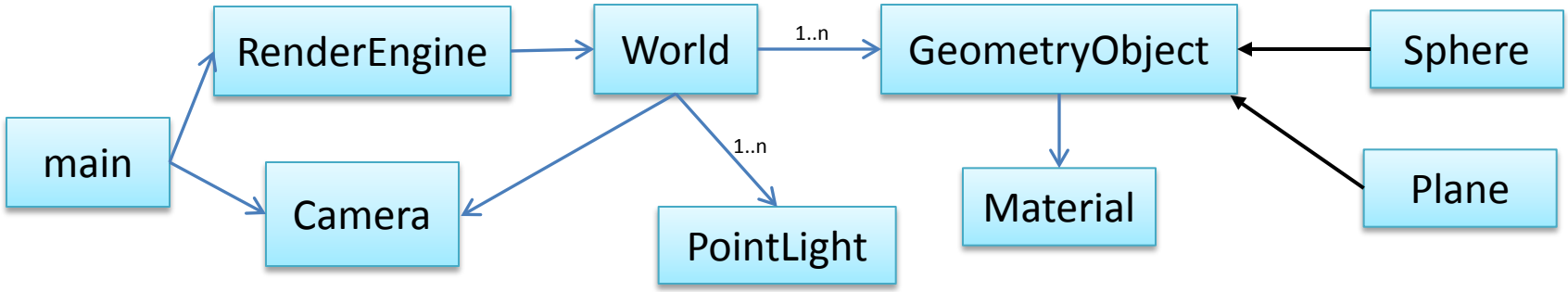
- Shapes:
  - `GeometryObject` class parent class for shapes
    - Has pointer to the `Material`
  - `Sphere` – inherits from `GeometryObject`
    - Knows how to compute hit point:
      - intersection of ray with itself
    - Knows how to calculate the normal at hit point
- `Material` – holds surface properties of shapes
  - Color, reflection coefficients, specularity
- `PointLight` – hold light properties
  - Color, intensity, location



Utility Classes

- **`RBGColor`** - stores rgb color
- **`Vector3D`** – store xyz. Can represent
  - Vectors, points
- **`Ray`** – stores ray properties
  - Starting point, direction
- **`ShadeRec`** – convenience class for storing hit point properties
  - Location, normal, Material, tmin (ray parameter)
- **`Constants`** – holds global constants

Classes



ShadeRec Ray RGBColor Vector3D Constants