

# Project #3: Cameras

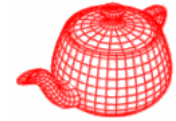
Assign: 8/29

Due: 11:59pm 9/3

Submission: send all your java sources in a zip file and send it to me. Note that the project is accumulated.

You may update files in previous projects. Thus, for each submission, please include all files including ones from previous projects.

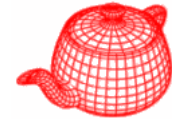
# RGB



---

```
Class RGB {  
    public float r, g, b;  
}
```

# Camera



```
public class abstract Camera {
    protected float left, right;
    protected float top, bottom;
    protected int width, height;
    protected Film film; // a 2D array of RGB

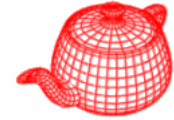
    Camera( float left, float right, float up,
           float bottom, int width, int height);
    public abstract Ray GenerateRay(int x,int y);

    public boolean AddSample(int x, int y, RGB p);
    public boolean WriteImage(String fname);
};
```

# Camera models



# Camera models

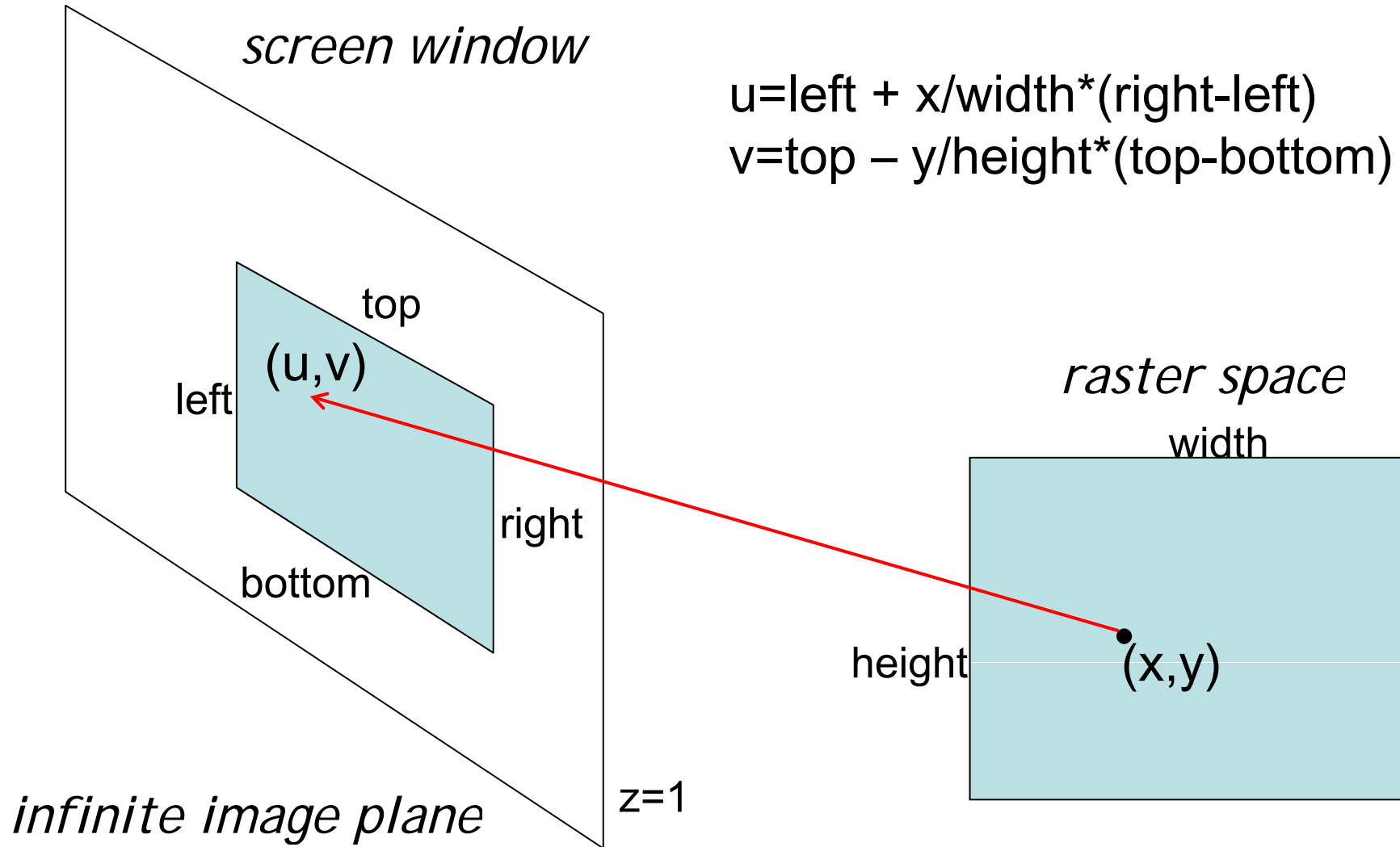
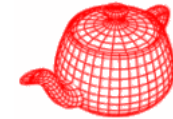


---

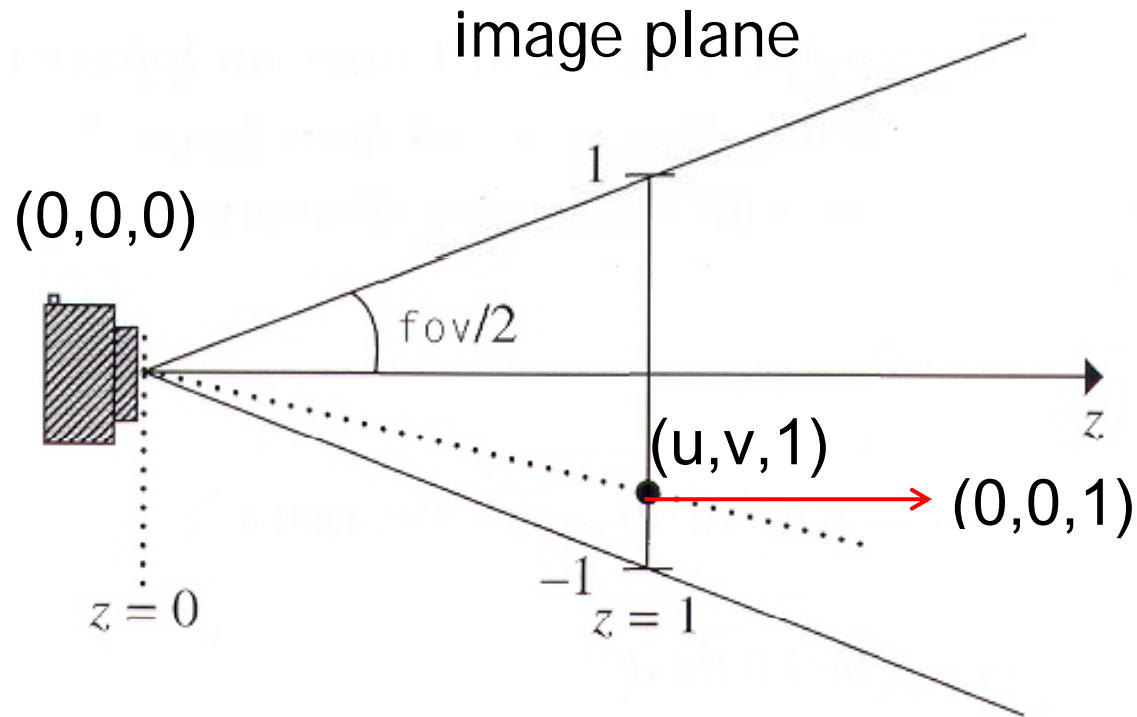
```
public class Orthographic extends Camera {  
    public Ray GenerateRay(int x,int y) {  
        ...  
    }  
}
```

```
public class Perspective extends Camera {  
    public Ray GenerateRay(int x,int y) {  
        ...  
    }  
}
```

# Screen space

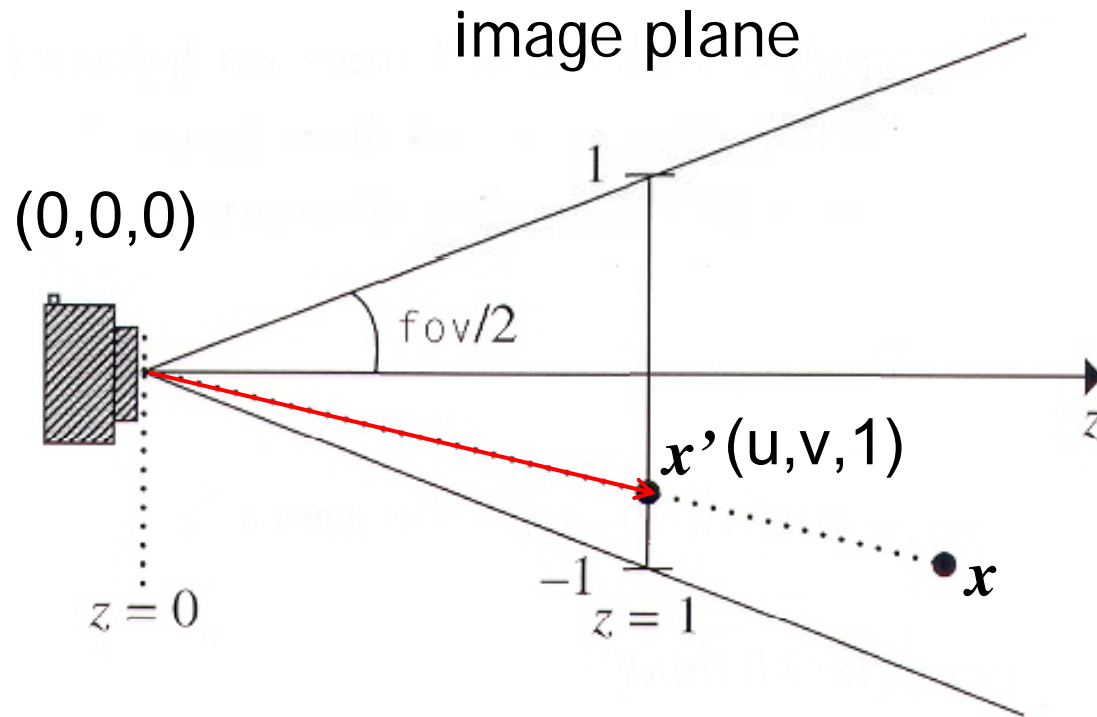
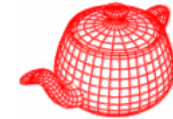


# Orthographic camera



o:  $(u,v,1)$   
d:  $(0,0,1)$

# Perspective camera



$o: (0,0,0)$

$d: (u,v,1).normalize()$



# PFM (portable float map)



- 
- <http://paulbourke.net/dataformats/pbmhdr/>

- Format

PF

640 480

1.0000

[float numbers for each pixel one by one]

- Can be viewed by xnview