CSE4203: Computer Graphics
Course Outline

Outline

- Course Objective

- Required Books

- Week-wise Plan

- Tentative Date of Quizzes

- Marks Distribution

- Some Questions

Course Objectives

- Comprehend the basics of computer graphics and the graphics pipeline

- Apply 2D and 3D linear transformation, viewing, rasterization techniques, shading models and textures.

- Analyze different algorithms used in computer graphics.

Required Books

- No specific book will be strictly followed in this course.
- Several books and online resources will be followed.
- I will share the references/book chapters/links for deeper understanding

Required Books

1. Fundamentals of Computer Graphics", 4th Edition. Authored by: Steve Marschner Peter Shirley

2. Computer Graphics, C Version, 2nd Edition Authored by: Donald Hearn, M. Pauline Baker

3. Real-Time Rendering, Fourth Edition Authored by: Tomas Akenine-Möller, Eric Haines

Week-wise Plan

Week	Topic
1	Introduction to Computer Graphics, Course Outline, and Motivation behind the course; Definition of Computer Graphics, Graphics areas and applications, Graphics API and Graphics pipeline.
2	Raster Device, Digital image representation and compression techniques, Color models and Color spaces, Raster Devices (LED and LCD)

Week-wise Plan

Week	Topic
3	Introduction to Vector Graphics, Line and curve representations, Bezier Curves, B-Spline Curves
4	Transformation and 2D Linear Transformation, Composite Transformation, Inverse Transformations, 3D Transformation, Rotation about an arbitrary line

Week-wise Plan

Week	Topic
5	Viewing Transformation, Viewport Transformation, Orthographic Projection Transformation, and Camera Transformation; The Camera Transformation and Projective Transformations
6	Perspective Projection, Field-of-View, and Review of Transformations
7	More about Graphics Pipeline, Stages of Graphics Pipeline, Introduction to Rasterization and Line Drawing, Line Drawing

Week-wise Plan

Week	Topic
8	Circle Drawing, Triangle Rasterization and Introduction to Clipping, Clipping Before the Transform and Clipping in Homogeneous Coordinates.
9	Clipping against a Plane, perations Before and After Rasterization, Simple 2D Drawing and A Minimal 3D Pipeline, Using a z-Buffer for Hidden Surfaces, Per-vertex Shading, and Per-fragment Shading and Simple Antialiasing and Culling Primitives

Week-wise Plan

Week	Topic
10	Texture Mapping for Rasterized Triangle Data Structures for Graphics, Mesh Topology
11	Introduction to Surface Shading, Diffuse Shading, Diffuse Shading, and Phong Shading
12	Introduction to Fractals and Self-Similarity, Fractal Dimension, Recursive generators, L-systems (Lindermeyer), Mandelbrot equation, Applications of fractals in computer graphics

Week-wise Plan

Week	Topic
13	Introduction to Ray Tracing and Basic Ray Tracing algorithm, Ray-Object Intersection, A Ray Tracing program and Shadows
14	Review classes.

Tentative Date for Quizzes

- Quiz 1 (Week - 4)

- Quiz 2 (Week – 7)

- Quiz 3 (Week – 10)

- Quiz 4 (Week – 13)

Marks Distribution

Class Performance	10%
Quizzes (Best 3 Out of 4)	20%
Final Examination	70%

Some Questions (1)

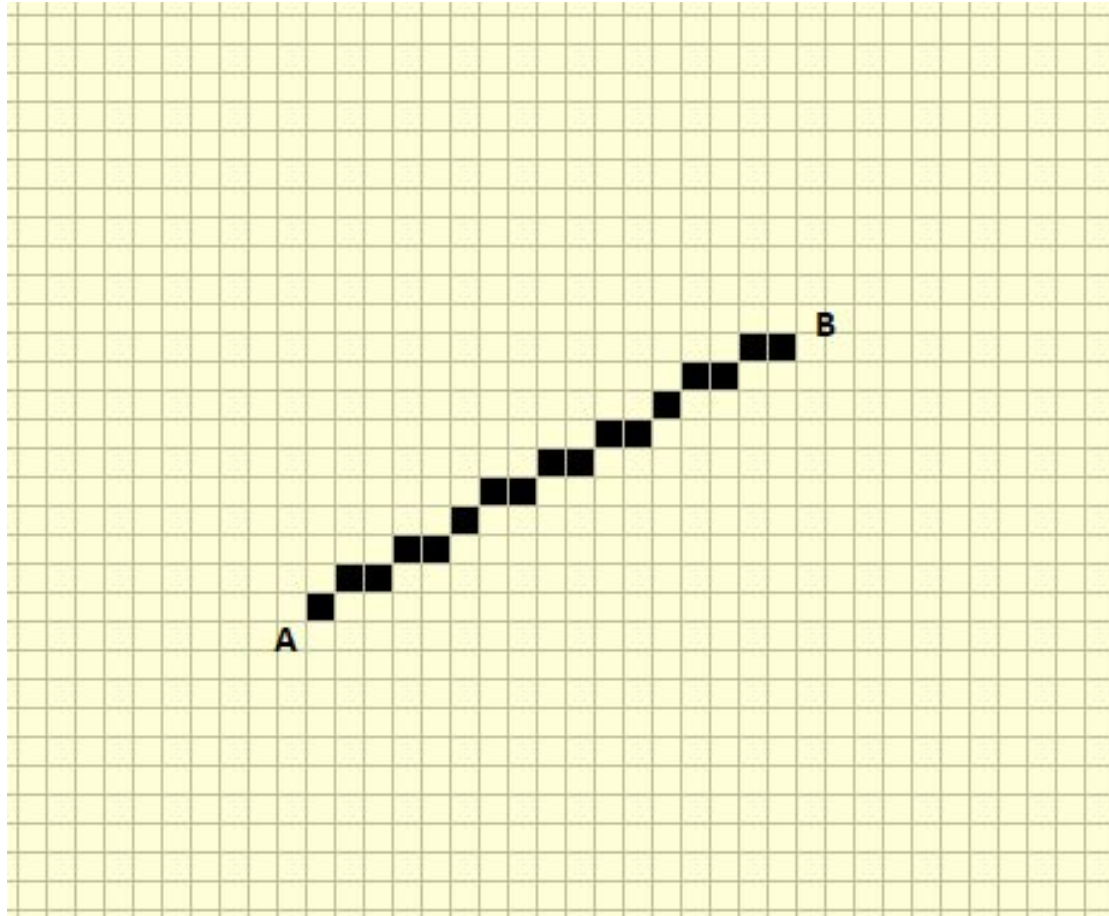We have two points namely A and B. How does computer draws the line AB?
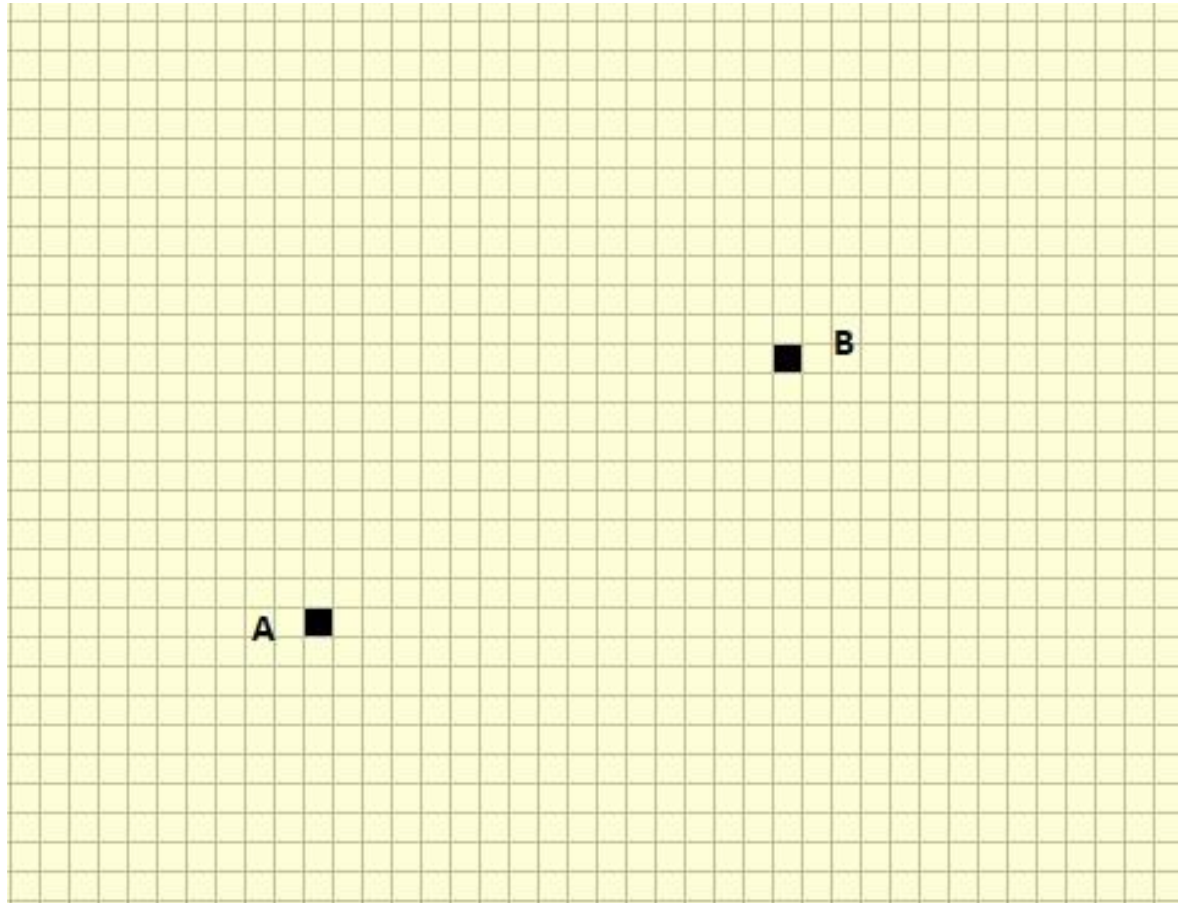
Some Questions (1)

We have two points namely A and B. How does computer draws the line AB?
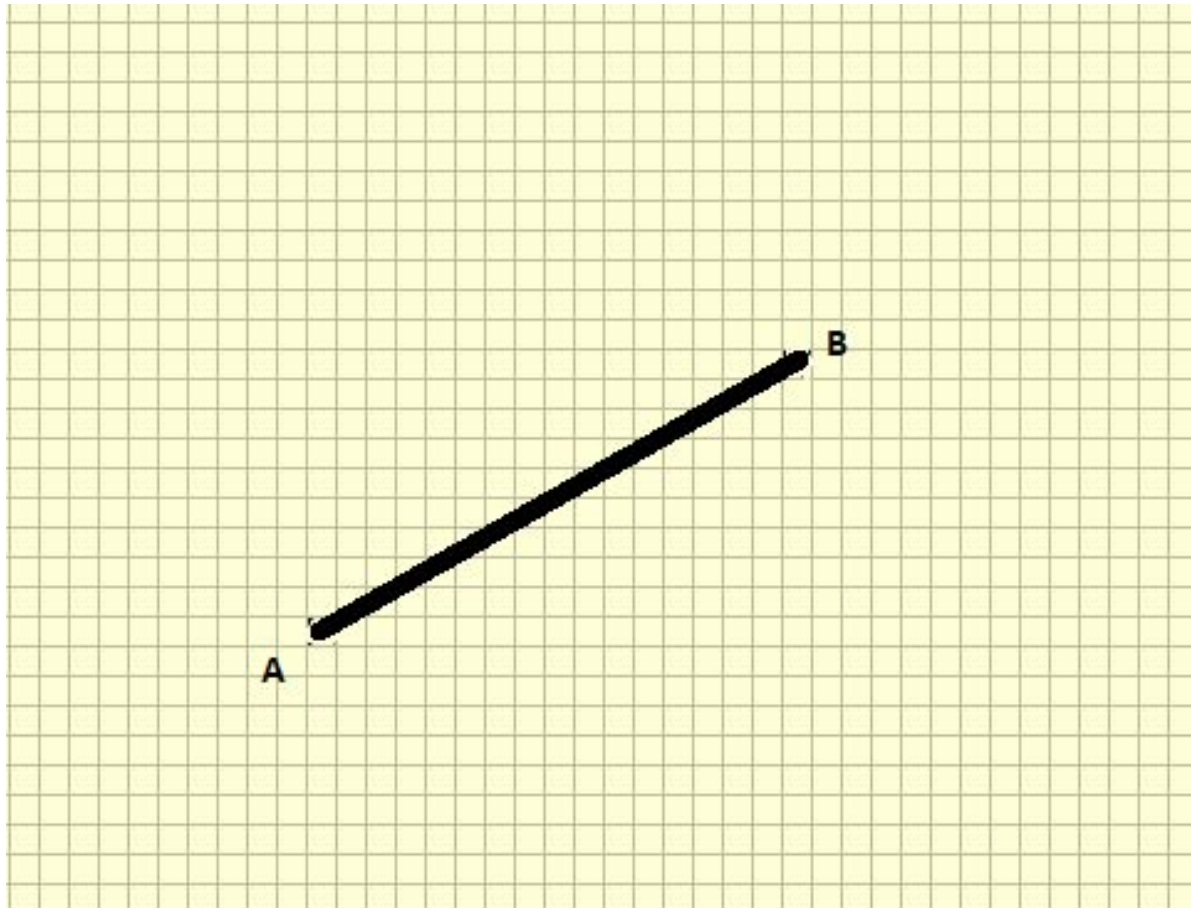
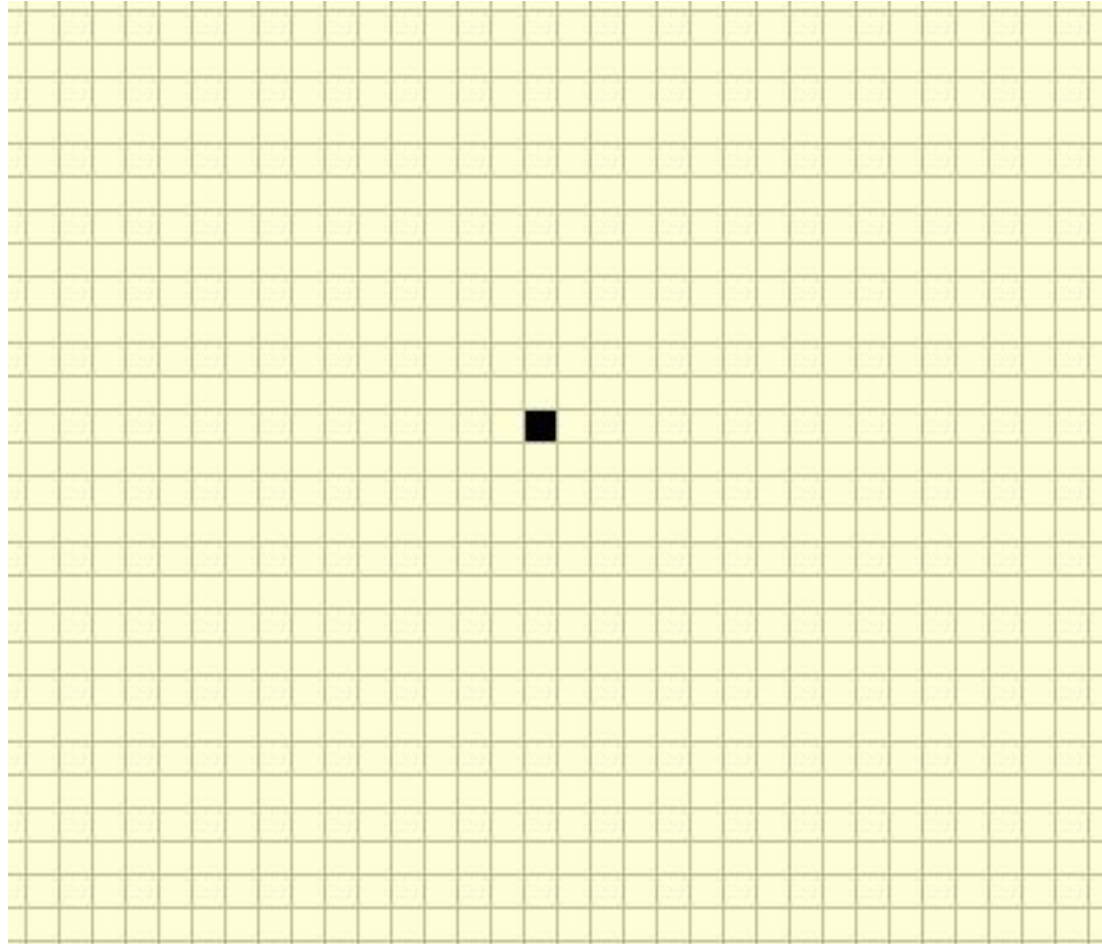**Is this correct?**

Some Questions (1)

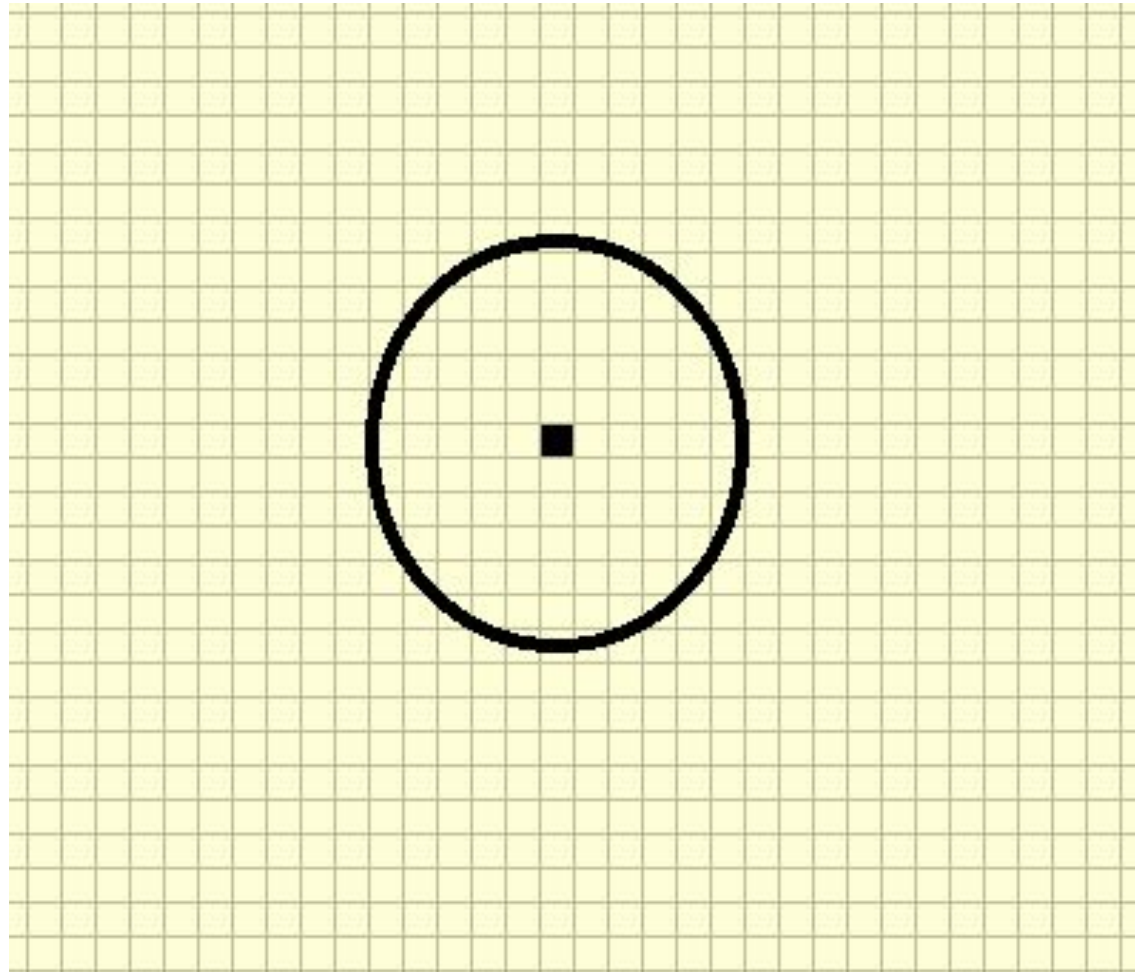We have two points namely A and B. How does computer draws the line AB?

Some Questions (2)

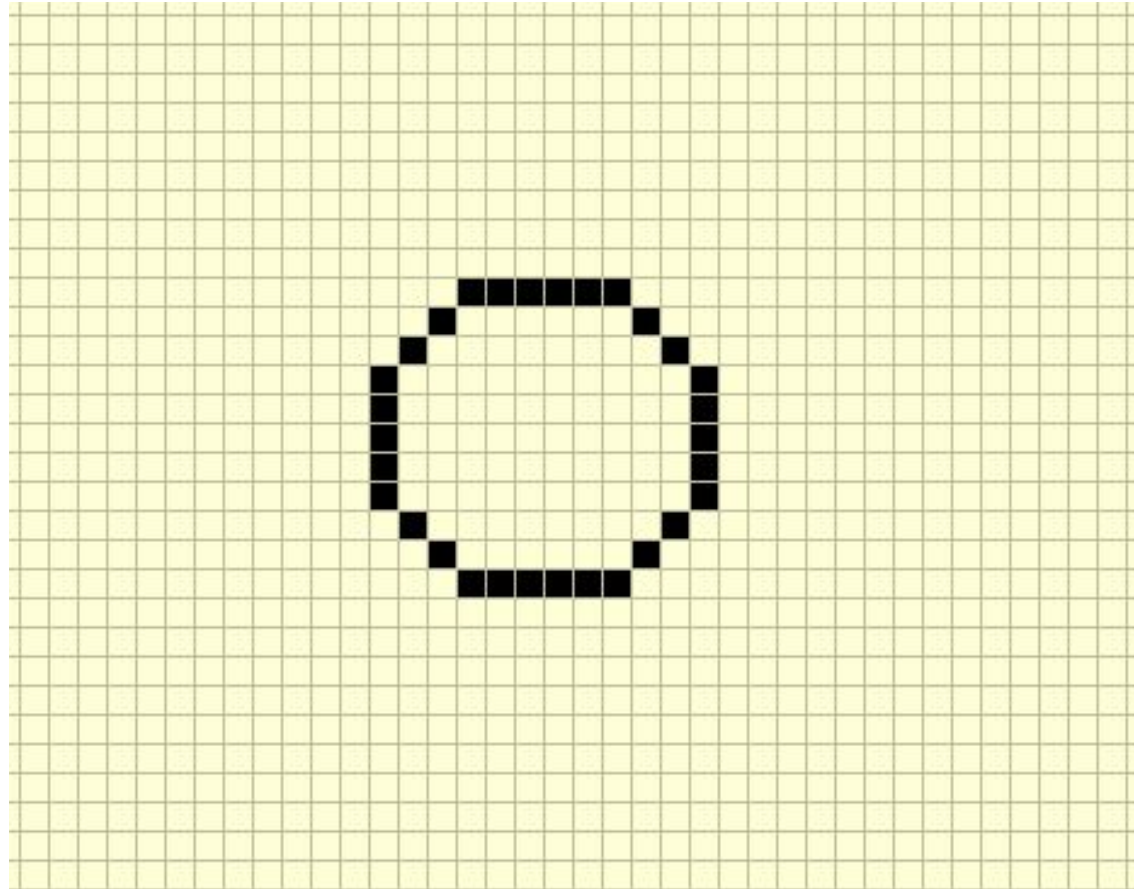How does computer draws a circle having radius of 5 pixels?

Some Questions (2)

How does computer draws a circle having radius of 5 pixels?

Some Questions (2)

How does computer draws a circle having radius of 5 pixels?

A Pixel Is *Not* A Little Square,
A Pixel Is *Not* A Little Square,
A Pixel Is *Not* A Little Square!
(And a Voxel is *Not* a Little Cube)[1]

Technical Memo 6

Alvy Ray Smith
July 17, 1995