

(SOLUTION)

A



Inspiring Excellence

CSE423: Computer Graphics

Summer 2025

Quiz 1

Time: 20 minutes

Marks : (/20)

Name:	Id:	Sec:
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[CO1] Q1) If a monitor can process 100,000 bytes per milliseconds. Given that it runs at 40FPS and has a pixel depth of 24 bits. Calculate the total number of pixels rendered in a frame.

(5 Marks)

$$1 \text{ frame} = \frac{1}{40} \text{ s} = 25 \text{ ms}$$

$$\rightarrow \text{in } 25 \text{ ms} / 1 \text{ frame} = 100,000 \times 8 \times 25 = 20000000 \text{ bits}$$

$$\rightarrow \text{pixels in 1 frame} = \frac{20000000}{24} = \underline{\underline{833,333}} \text{ pixels (Ans)}$$

[CO1] Q2) Calculate the pixel using DDA (Digital Differential Analyzer) Algorithm for a line that goes from (-10, -20) to (-14, -23).

(15 Marks)

$$\Delta y = -3 \quad \Delta x = -4 \quad m = 0.75$$

$$x_{k+1} = x_k - 1$$

$$y_{k+1} = y_k - m$$

x	y	y rounded	PIXEL
-10	-20	-20	(-10, -20)
-11	-20.75	-21	(-11, -21)
-12	-21.5	-22	(-12, -22)
-13	-22.25	-22	(-13, -22)
-14	-23	-23	(-14, -23)

(Ans!)

B



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[CO1] Q1) For a monitor the image size is 2,120,000 bytes. It has a pixel depth of 32 bits and runs at 120FPS. Calculate the rendering speed of the monitor in (pixels per milliseconds).

(5 Marks)

$$\text{pixels in one frame} = \frac{2,120,000 \times 8}{32} = 530,000 \text{ pixels}$$

$$\rightarrow 1 \text{ frame} = \frac{1}{120} \text{ s} = 8.33 \text{ ms}$$

$$\rightarrow \text{Rendering speed} = \frac{530,000}{8.33} = \underline{\underline{63600}} \text{ pixels per millisecond} \quad (\text{Ans!})$$

[CO1] Q2) Calculate the pixel using DDA (Digital Differential Analyzer) Algorithm for a line that goes from (-12, -20) to (-15, -24).

(15 Marks)

$$dy = -4$$

$$dx = -3$$

$$m = \frac{4}{3} \text{ or } 1.33$$

$$x_{k+1} = x_k - \frac{1}{m}$$

$$y_{k+1} = y_k - 1$$

x	y	x rounded	Pixel
-12	-20	-12	(-12, -20)
-12.75	-21	-13	(-13, -21)
-13.5	-22	-14	(-14, -22)
-14.25	-23	-14	(-14, -23)
-15	-24	-15	(-15, -24)

Ans!

C



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[CO1] Q1) If a monitor can process 200,000 bytes per milliseconds. Given that it runs at 120FPS and has a pixel depth of 8 bits. Calculate the total number of pixels rendered in a frame.
(5 Marks)

$$1 \text{ frame} = \frac{1}{120} \text{ s} = 8.33 \text{ ms}$$

$$\rightarrow \overset{\text{Bits}}{\text{Pixels}} \text{ in a frame} = 200,000 \times 8 \times 8.33 = 1,332,800 \text{ bits}$$

$$\rightarrow \text{pixels} \text{ " " " } = \frac{1,332,800}{8} = \underline{\underline{166,600 \text{ pixels (Ans!)}}}$$

[CO1] Q2) Calculate the pixel using DDA (Digital Differential Analyzer) Algorithm for a line that goes from (10, -20) to (13, -24).

(15 Marks)

$$dy = -4 \quad dx = 3$$

$$m = -4/3 \text{ or } -1.33$$

$$y_{k+1} = y_k - 1$$

$$x_{k+1} = x_k - \left(\frac{1}{m}\right)$$

x	y	x rounded	Pixel
10	-20	10	(10, -20)
10.75	-21	11	(11, -21)
11.5	-22	12	(12, -22)
12.25	-23	12	(12, -23)
13	-24	13	(13, -24)

Ans

D



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Marks : (/20)

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[CO1] Q1) For a monitor the image size is 3,150,000 bytes. It has a pixel depth of 16 bits and runs at 240FPS. Calculate the rendering speed of the monitor in (pixels per milliseconds).

(5 Marks)

$$\text{pixels in 1 frame} = \frac{3,150,000 \times 8}{16} = 1,575,000 \text{ pixels.}$$

$$\rightarrow 1 \text{ frame} = \frac{1}{240} \text{ s} = 4.17 \text{ ms}$$

$$\rightarrow \text{Rendering speed} = \frac{1,575,000}{4.17} = \underline{\underline{378,000}} \text{ (pixels per millisecond)} \quad (\text{Ans})$$

[CO1] Q2) Calculate the pixel using DDA (Digital Differential Analyzer) Algorithm for a line that goes from (22, -15) to (26, -18).

(15 Marks)

$$\Delta y = -3 \quad \Delta x = 4$$

$$m = -\frac{3}{4} \text{ OR } -0.75$$

$$x_{k+1} = x_k + 1$$

$$y_{k+1} = y_k + m$$

x	y	y rounded	PIXEL
22	-15	-15	(22, -15)
23	-15.75	-16	(23, -16)
24	-16.5	-17	(24, -17)
25	-17.25	-17	(25, -17)
26	-18	-18	(26, -18)

(Any!)