**Observation:-**

Now whenever we set width of canvas to 100vw then left default margin work but right default margin does not work the edge is stretched to the full right edge of the window(may be it is only for canvas who knows)

**tell me how i can give me a road map so that i can master web graphics of 2D and 3D**

Here's a **step-by-step roadmap** to master **Web Graphics (2D & 3D)** — from **basics to expert level**, using the latest web technologies like **Canvas, SVG, WebGL, Three.js**, and even **shaders**.

**🛣️ Roadmap to Master Web Graphics (2D + 3D)**

**🧱 Stage 1: Foundation (HTML/CSS + JavaScript)**

Start here if you're new.

* ✅ **Learn HTML5 Canvas & SVG basics**
* ✅ Master JavaScript DOM manipulation

**📘 Resources:**

* Book: *HTML5 Canvas* – Steve Fulton & Jeff Fulton
* MDN Docs: [Canvas API](https://developer.mozilla.org/en-US/docs/Web/API/Canvas_API), [SVG](https://developer.mozilla.org/en-US/docs/Web/SVG)

**🔧 Skills to Learn:**

* Drawing shapes (rectangles, circles, lines)
* Path, fill, stroke
* Text rendering
* Animation using requestAnimationFrame

**🎨 Stage 2: 2D Graphics Mastery**

Use JS libraries for animations and effects.

**🔧 Learn:**

* Canvas animation
* Game loops & physics
* Particle effects

**📚 Tools & Libraries:**

* **p5.js** – Easy for drawing and animation
* **PixiJS** – High-performance 2D rendering
* **Anime.js / GSAP** – For cool animations

**🎯 Projects:**

* Drawing app
* 2D platformer or shooter game
* Particle explosion effect

**🧊 Stage 3: Intro to 3D Graphics**

Now level up to 3D.

**🔧 Learn:**

* Basics of **WebGL**
* 3D coordinate systems
* Vertices, shaders, and transformations

**📘 Resources:**

* Book: *WebGL Programming Guide* – Kouichi Matsuda
* Course: Interactive 3D Graphics by Udacity

**🌐 Stage 4: Master 3D with Three.js**

Three.js makes WebGL easy & powerful.

**🔧 Learn:**

* Creating scenes, meshes, cameras
* Lighting, shadows, textures
* 3D models (.glb/.gltf)
* Animations & interactivity

**📚 Resources:**

* Book: *Discover Three.js*
* Website: [threejs.org](https://threejs.org)
* Tool: Blender (for 3D modeling)

**🎯 Projects:**

* 3D product viewer
* 3D animated portfolio site
* Basic WebGL games

**💡 Stage 5: Advanced Web Graphics**

Dive into shaders and performance.

**🔧 Learn:**

* GLSL shaders (vertex & fragment)
* Post-processing effects
* Physics & collision (use Ammo.js, Cannon.js)
* GPU-based rendering

**🛠 Tools:**

* ShaderToy (to test GLSL)
* glTF + Blender
* React Three Fiber (Three.js with React)

**✅ Summary Table**

| **Stage** | **Focus** | **Tools** |
| --- | --- | --- |
| 1 | HTML Canvas + SVG | HTML5, JS, MDN |
| 2 | 2D Libraries | p5.js, PixiJS, GSAP |
| 3 | WebGL Basics | Raw WebGL |
| 4 | 3D Simplified | Three.js, Blender |
| 5 | Advanced 3D | GLSL, React Three Fiber, Physics libs |

**🔁 Practice Ideas:**

* 🎨 Online drawing tool (2D)
* 🎮 Mini games (2D/3D)
* 🌀 Animated portfolio site with 3D effects
* 🌍 3D Earth visualization with lighting and shaders

Let me know if you want a **weekly study plan** or **project ideas at each level**!