Project Documentation
Title: Planets – Computer Graphics Mini Project

Submitted by:
Karishma Singh Chauhan (04301012018)
Pranjli Singh (05001012018)
Megha Gupta (05701012018)
Rhea Hooda (06001012018)
Sara Anwer (06201012018)

Submitted to:
Ms Vibha
Assistant Professor
CSE Department

IGDTUW

ABOUT

Planets is a website for displaying information about the planets in our solar system in an attractive way using multimedia in HTML, CSS and JavaScript. It can also be used for educational purposes and demonstrations. Using very interesting and appealing graphics and animations, we have tried to include information about the various planets in the solar system by mentioning their corresponding Wikipedia links also along with the content.

The project uses animations, text and images to attractively show the usage of multimedia to make webpages look understandable and beautiful at the same time. It also consists of movement when the mouse hovers over objects and Webflow library for front-end. The website includes a feedback form and a page displaying the contributors. For a proper completion, the project involves a display of the movements of all the planets in our solar system using graphics in C++.

Theory

1. HTML

HTML stands for Hyper Text Markup Language. It is used to design web pages using markup language. HTML is the combination of Hypertext and Markup language. Hypertext defines the link between the web pages. Markup language is used to define the text document within a tag which defines the structure of web pages. This language is used to annotate (make notes for the computer) text so that a machine can understand it and manipulate text accordingly. Most markup languages (e.g. HTML) are human

readable. Language uses tags to define what manipulation has to be done on the text. HTML is a markup language used by the browser to manipulate text, images and other content, in order to display it in the required format. HTML was created by Tim Berners-Lee in 1991. The first ever version of HTML was HTML 1.0, but the first standard version was HTML 2.0, published in 1999.

Elements and Tags: HTML uses predefined tags and elements which tell the browser how to properly display the content. Remember to include closing tags. If omitted, the browser applies the effect of the opening tag until the end of the page.

HTML page structure: The basic structure of an HTML page is laid out below. It contains the essential building-block elements (i.e. doctype declaration, html, head, title, and body elements) upon which all webpages are created.

2. CSS

Cascading Style Sheets, fondly referred to as CSS, is a simply designed language intended to simplify the process of making web pages presentable. CSS allows you to apply styles to web pages. More importantly, CSS enables you to do this independent of the HTML that makes up each web page. CSS is easy to learn and understood but it provides powerful control over the presentation of an HTML document.

3. Javascript

JavaScript is a lightweight, cross-platform and interpreted scripting language. It is well-known for the development of web pages, many non-browser environments also use it. JavaScript can be used to effectively create animations, games, 3D scenes, and other requirements. JavaScript

contains a standard library of objects, like Array, Date, and Math, and a core set of language elements like operators, control structures, and statements.

4. Webflow

Webflow is an in-browser design tool that gives you the power to design, build, and launch responsive websites visually. It's basically an all-in-one design platform that you can use to go from the initial idea to ready-to-use product.

Here are a few things that make Webflow different:

- The visual design and code are not separated.
  What you create in the visual editor is powered by HTML, CSS, and JavaScript.
- It allows you to reuse CSS classes.
  Once defined, you can use a class for any elements that should have the same styling or use it as a starting point for a variation (base class).
- It is a platform and as such, it offers hosting plans.
  For $12 per month, it allows you to connect a custom domain and host your HTML site. And for an additional $4 per month, you can use the Webflow CMS.

5. GSAP

The GreenSock Animation Platform (GSAP) is a popular set of JavaScript tools for building animations on the web. Anything we see in your web browser can be animated with GSAP. It contains four possible libraries—TweenLite, TweenMax, TimelineLite and TimelineMax. Whether we want to build elegant UI animations or dynamic effects in web apps, games, and interactive stories; GSAP is up to the task. We simply write short

snippets of JavaScript code that define how elements should animate and what the timing should be. The benefit of animating with code is that one line of code can animate one thing just as easily as it can animate 1,000 things.

6. **SWIPER SLIDER**

A slider is a term that refers to a slideshow on a website. Swiper is the free and most modern slider with hardware accelerated transitions and amazing native behavior. It is intended to be used in websites, web apps. "Swiper.js" script is used to implement slider functionality which has been used in the website.

Code Snippets

Our Mini Project – Planets is basically a depiction of the planets in our solar system using various graphics and animations available in graphics.h library in cpp and also through a website (HTML, CSS and JS). Here, we will be going through some specific sections of code which form the backbone of the project.

1. **Parallax.js**

Parallax – Parallax is the apparent displacement of an object because of a change in the observer's point of view. Another way to see how this effect works is to hold your hand out in front of you and look at it with your left eye closed, then your right eye closed. Your hand will appear to move against the background. This effect can be used to measure the distances to nearby stars. In simple words, when two objects are seen on a straight line, they seem to be coincident. If the objects are at different places and the

eye is moved sideways then there is a relative displacement between them. The nearer object moves in the opposite direction while the further object moves in the same direction of eye. Such relative displacement is called parallax.

Parallax scrolling is a web site trend where the background content (i.e. an image) is moved at a different speed than the foreground content while scrolling. This is basically a web design effect that consists of simulating the movement of objects on a web at different speeds and in different "layers". By creating the illusion that there is a background and figures in the foreground, it manages to trick our brain into thinking we are looking at a 3D landscape.

Following lines of code helps to include Parallax.js in our HTML page –

<script src="https://cdnjs.cloudflare.com/ajax/libs/parallax/3.1.0/parallax.min.js"></script>

What parallax.js will do is create a fixed-position element for each parallax image at the start of the document's body. This mirror element will sit behind the other elements and match the position and dimensions of its target object. We have added this parallax effect in the initial image of the Earth at the top of the page – Explore the Unseen. There as we move the mouse pointer across the screen, the background and the foreground images shift by different distances relatively. The collective effect of such movements gives the webpage a 3-Dimensional appearance.

Parallax.js demonstration

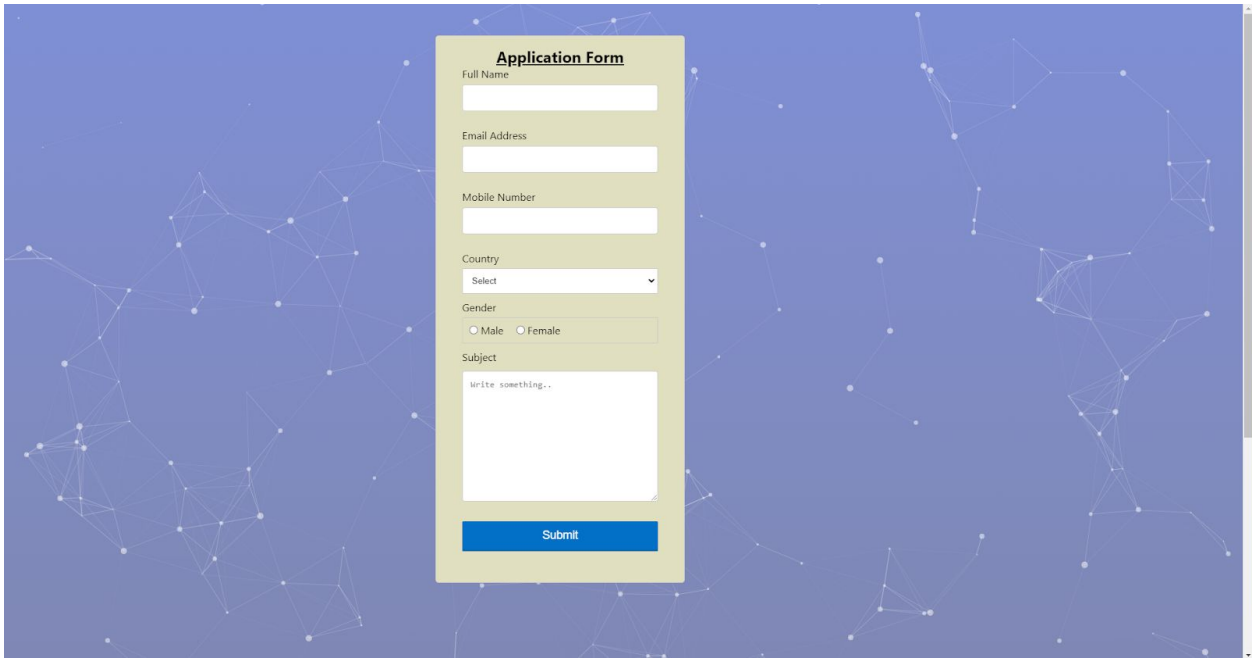
2. **Particle.js**

Particles.js is a lightweight JavaScript library used for creating particles which look like the vertices of a polygon. We can also interact by hovering over the particles and create more particles by clicking on particles. We use this library in our portfolios which will definitely attract many users and will look good in the website. We have used this javascript library for adding the beautifully animated background of our "Contact Us" page. That webpage has an application form which the users can fill out with their details and any concerns.message for the developers of the website.

Following lines of code helps to include Particle.js in our HTML page –
<script src="particles.js"></script>
<script src="app.js"></script>

Such a background formed using Parallax.js is not like the other usual static webpages. The particles used in the background move in random paths and directions. Also, it is responsive to the movements of the cursor i.e. the

background particles move away when we hover the mouse over them. We can change particles properties and interactivity by modifying app.js and then see the magic.



Particle.js demonstration

Future Scope

Future work concerns adding some interactive features which include making many more web pages associated with this website to beautifully display and animatedly show more information about the universe. Also a slack channel will be added where users can share their knowledge with each other. Also the website can include little quizzes on the basis of the animations and data that is displayed to them. The website in the future

versions will consist of the dynamic updation of information displayed if it is accepted by the contributors.

References

Websites referred –

- https://www.w3schools.com/
- https://developer.mozilla.org/en-US/
- https://javascript.info/
- https://www.geeksforgeeks.org/
- https://www.ma-no.org/en/