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BLUEPRINT OF THE GRAPHICAL GALAXY OF SOLAR SYSTEM SEGMENT: AN ALGORITHMIC APPROACH USING CSS3.0

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ABSTRACT

Theorizing from the literature of galaxy it has come out that a galaxy is a gravitationally bound system having collection of stars, stellar remnants, an interstellar medium of gas, dust, dark matter etc. [1]. In this paper the central theme is to design graphically a blue print of a tiny segment of galaxy i.e. solar system. With this objective to frame the solar system in computer graphics novel technologies were brought into play. Here Sun will be as cynosure and nine planets will be traversing the Sun following their own orbits. Along with the satellites will be rounding positioning the planets as centre. An optimized algorithm approach is employed to design the planetary system centering the sun as pivot.

General Terms

Computer Graphics, User Interface Design, Algorithms

Keywords: E-solar system, Graphics, CSS, User Interface Design.

1.   INTRODUCTION

To be introduced with solar system, literary it can be referred to that the Solar system comprised of the Sun and nine planets surround it following their own orbits. The solar system was formed around 4.6 billion years back from the gravitational explosion of a giant molecular cloud. The entire mass of the cloud was broken into pieces what in turn formed the Sun with the maximum mass and also other objects like all other planets in the solar system. The remaining mass except the Sun was shared into Jupitar, Saturn, Urenus, Neptune, Venus, Earth, Mars and Mercury. In this context the Pluto is excluded as a non planet. Graphically designing the e-Solar system as a small segment of the entire galaxy is the key motto using the technologies like CSS3, JAVASCRIPT in terms of scripting and C# as programming language and ASP.NET as GUI (Graphical User Interface) of web applications.

2.   PRILIMINARIES

Cascading and Style Sheet 3 (CSS3) is the most upgraded standard of CSS and totally backwards-compatible. CSS specifications are maintained through the World Wide Web Consortium (W3C). It is a style sheet language used to do formatting of documents which are written in any markup language. CSS is a cornerstone technology used mostly in web

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applications or mobile applications to make them graphically lucrative [7]. The styles can be included within the markup language itself as hard code and can be just hyperlinked into folder structure where it resides as well. Best practice while developing a web application is to separate the markups that is the content of the application and the styles that is the presentation [8][9].

CSS3 contains the novel modules like selectors, box model, backgrounds and borders, image values and replaced content, text effects, 2D/3D transformations, animations, multiple column layout and user interface[10][11][12].

Javascript, developed by Brendan Eich while working for Netscape Communications Corporation, is used in server side network programming as a part of web browsers. Through the implementation of Javascript, users can be interacted via client side code [13].

ASP.NET Web pages are the main building blocks for application development. The web server IIS (Internet Information Service) is used to host the web pages [14].

3.   METHODOLOGIES

Microsoft Visual Studio DOT NET 2014 is used here to make this web application to be supported with JAVASCRIPT and CSS. Of the various installed templates, ASP.NET Web Form is created to facilitate the environment to CSS3 and JAVASCRIPT to work out. The web form is designed through CSS3 programming. The CSS code is kept in a separate folder within the application itself. From the solution explorer this folder is referenced. Using server controls of ASP.NET in build toolbox required controls are dragged into the web form though recommendation is to write the appropriate ASP.NET scripts to design the specific web page. Ultimately the appropriate CSS is tagged with the scripts to make the design as desired.

1.1 Algorithm

The algorithm to design the e-solar system using the aforesaid technologies is as follows:

Step 1: start

Step 2: Specify star and define the star class

> 2.1 Specify the width in pixel
>
> 2.2 Specify the height in pixel
>
> 2.3 Specify the margin with 4 co-ordinates in pixel
>
> 2.4 Specify the border radius in percentage
>
> 2.5 Specify the box shadow with color code
>
> 2.6 Specify the background with color code

Step 3: Definition of the planet with the specification of the transformation in terms of skew in degree.

> 3.1 Two-dimensional linear transformation applied to an element with skew degrees in x and y both coordinates.
> 3.2 To transform an element in two-dimensional (2D) or three-dimensional (3D) space webkit-transform property is to be specified with skew degrees in both X and Y coordinates.

3.3 Microsoft extension property i.e. -ms-transform is the property to provide implementation of the CSS 2D Transforms in skew degrees in X & Y coordinates.

3.4 Two-dimensional transformation is to be applied to an element through the -o-transform property.

3.5 The transform property is to be applied to skew in degrees.

Step 4: for the planet orbit trace define the height, width and margin of the orbit.

4.1 Height and width is to be assigned with pixels.

4.2 Margin is to be assigned with coordinates.

Step 5: for planet motion apply animations and the time in sec for the speed.

5.1 motion of the planet is to be added with seconds for animation

5.2 To combine common animation properties into a single property of the planet -webkit-animation property is added in seconds.

5.3 To combine six of the animation properties into a single property, applied for planets in terms of seconds.

5.4 Set animation property in seconds

Step 6: To define the planet itself, define the height, width, margin, box shadow and transformation of the respective planets by applying step1.

Step 7: Apply step 2, 3,4,5,6 to define the eight other planets of the planetary system.

Step 8: Finish.

4.   RESULTS AND DISCUSSION

Based on the algorithm the page of graphical planetary system surrounding the Sun is designed. Literally the activities made to make the graphical looks are translating, scaling, skewing, rotating, making matrix etc. The pictorial view of the said activities is shown in Fig 1.
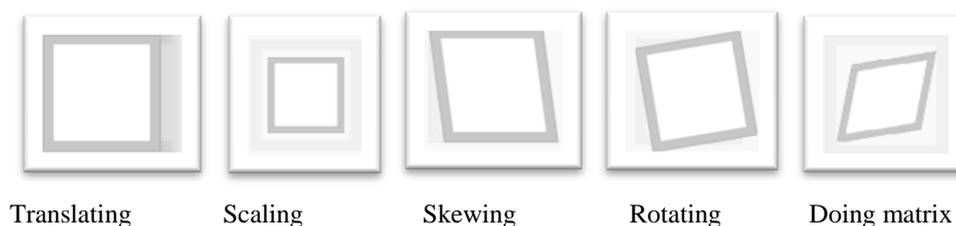

Translating   Scaling   Skewing   Rotating   Doing matrix

Fig 1: Graphical appearances using the activities like translating, scaling, skewing, rotating and doing matrix

Using these techniques CSS3 programming is done based on the inbuilt APIs. Each of the components like orbits, planets, Sun etc are designed and their appearances, velocity, positioning in a specific co-ordinates, movement towards a certain speed maintain the path of their own orbit etc are efficiently maintained using the already specified algorithm. Microsoft Dot Net framework is used as platform where the entire work is implemented and tested .The resultant output is shown in Fig 2.

Fig 2: Output of the graphical solar system as a segment of galaxy

5.   CONCLUSION AND FUTURE SCOPE

In this paper it is concluded that using recently developed designing tools like CSS3, graphical galaxy can be designed using its out of box features. Some limitations are there too such as, the movements of the planets are to be optimized, planets are to ornamented with their actual looks, have glimpse on other parts of the galaxy excluding the solar system, make available restructuring of planets individually with their own satellites. The limitations are the motivation to grow with this work as a part of future scope.

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