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GAME AND LEARN

The new approach to studying

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ABSTRACT

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This thesis is aimed to explain the benefits of studying by playing games along with a demonstration of a working application. The thesis describes method of the study with games while discussing the pros and cons as a result. It mentions various websites to give an idea of how visual and interactive games facilitate learning regardless of age limit inspired by the author's personal experiences during the author's academic years. There are ideas and suggestions about the benefits of study with games and how this method can be implemented to study in an exciting way, which can make difficult subjects easy to learn, especially for individuals who lack interest in learning.

Gaming can mostly only be pleasurable, but recent research has revealed there is also a range of scientific benefits to playing videogames, which covers a wide range, from improving one's intelligence to pain relief and cure to depression. The topic has been chosen based on the author's interest in making education motivating and fun for everybody.

Keywords:

Games, Study, Javascript, HTML, CPanel, React.

ABSTRACT

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1. INTRODUCTION

In this era of modern technology, people's lifestyle has changed technologically in every aspect. One cannot deny the influence of artificial intelligence in daily life today. The same is the scenario with the education system. Previously traditional books and papers were used to teach. Whereas at present, it has changed into soft copy-based learning as the extreme progress of technology. Nowadays, children prefer to learn through computers or various other electronic gadgets. It has an effective result in learning because, in this way, they can learn quickly simultaneously enjoy. Thousands of learning-based video game applications and other inventions have not just spread over the internet but also made the environment more comfortable and useful.

Moreover, research proves that video games increase the sharpness of our brain, and open new doors for learning. In general, younger people prefer video games more than older people because of the curiosity of learning new things. Researchers at Columbia University's Mailman School of Public Health in New York involved in the analysis of mental health data relating to video games have produced statistics that show the importance of handheld electronic devices and how these devices were used to teach the very first lesson of their life. Subjects in the study were observed to have found more interest in those courses for their career path later that involved games in the study. (Columbia Mailman School of Public Health 2019)

Furthermore, learning with games have noticeable changes over the human brain since it makes the brain active by increasing neuron synapses improving memory as they are liked by scientists, and thinking faster by enhancing reaction time. The continuous progress of technology has made our busy life flexible. A recent study has found that almost 91% of children who are gamers are of ages between 2 to 11. Through the research and this thesis, it is aimed to demonstrate the reason and how this tremendous increase in number of gamers amongst children can discover new horizons. (Columbia Mailman School of Public Health 2019)

In this thesis, examples are used to explain the benefits of learning or understanding something by playing games along with demonstrating a practical application as a trial of study with games. Various sources and websites were also provided to give a simple idea of games for learning in this thesis. Ideas and suggestions related to the benefits of education using games. At the same time that were previously implemented before this work are also featured. The use of games virtually over the internet to learn something new or teach further is becoming very popular these days in various institutions. The USA, China, and India are home to many different websites offering opportunities to learn simultaneously being easily accessible. Finland can be a potential player in raising awareness of online learning games in European countries.

2. SIGNIFICANCE OF GAMES

Nowadays, life has become more comfortable with advanced technology. However, in a few aspects, people have not caught up with the progress. Even though technology is improving and developing day by day, people are becoming more and more unintelligent. These very sophisticated and complicated technology is available with easy access. But such techniques are not very popular amongst parents desiring to teach their children, and the studies continue to be based on reading, memorizing, and writing like robots. For instance, learning a new language is followed by the same process of research; memorizing by heart and practicing. It is a process that can be hard, monotonous, and time-consuming. But if the process is altered by introducing interactive games with your gadgets like smartphones, tablets, laptops, desktops, TV, etcetera it can change and shape the minds to become smarter. Additionally, learning the same language is now less stressful and more enjoyable with game playing practice.

A popular opinion suggests that videogames have many benefits – the notable one being improving intellect. Videogames may teach children high-level thinking skills that they may need in the future. Children who play video games can have better intellectual and social skills than non-gamers, a recent scientific study suggests. And 25% of the gamers are over 50 years old as seen on social platforms like YouTube. That means gaming is not only for children but also for adults. A study, conducted by a team of international researchers at the Mailman School of Public Health at Columbia University, New York, analyzed mental data related to thousands of children aged 6 to 11 years old from across Europe. Questionnaires were given to parents and teachers in order to collect the data for the study, and children responded to questions through an interactive tool. The account for changes in development was demonstrated by the age and gender of the child, and the team noted that the high use of video games was associated with a 1.75-fold increase in mental activity and a high level of knowledge. Children who play multiplayer games are probably also "high school capacity" by 1.88 times. The impact of video games on the social skills of children is often a cause for concern, but the team has found a connection between great play and good friendships and excellent social skills. (Bolton, 2016)

3. GAMES WHICH HELP STUDIES

Video games are an increasingly popular activity in modern society, especially among young people. Electronic games are becoming more popular not just as a research tool, but in the field of study. Many research groups at universities have focused on the neural and behavioral effects of video games by utilizing many interactive video games in the past decades. The information is obtained through a variety of methods that offer the neurological correlation of video games. (Barnett, 2013)

The following example depicts a game that starts with mainly visual and theoretical slides that describe concepts in short and with visible bodies like ports, routers, cable, network, and many more, as depicted in the diagrams. The games take an instant MCQ test. If someone gives wrong answers, the website will provide another briefing of that topic, and then the question is asked again until it is successfully answered by the learner or website user.

The following figure denotes such an example of an interactive and enjoyable game to learn the Finnish language.



FIGURE 1- Home page of the website for Finnish language learning. (24.)

When one of the topics is selected as depicted in figure 2, a slide like this appears from where the game can begin. It shows about learning Fruit and Vegetable names in the Finnish language.



FIGURE 2- Learning by fruits name. (24.)

Then the task begins by asking the names of each item, and you select which one you think is the right name. If you can give the correct answer, then the program will ask about the next item.

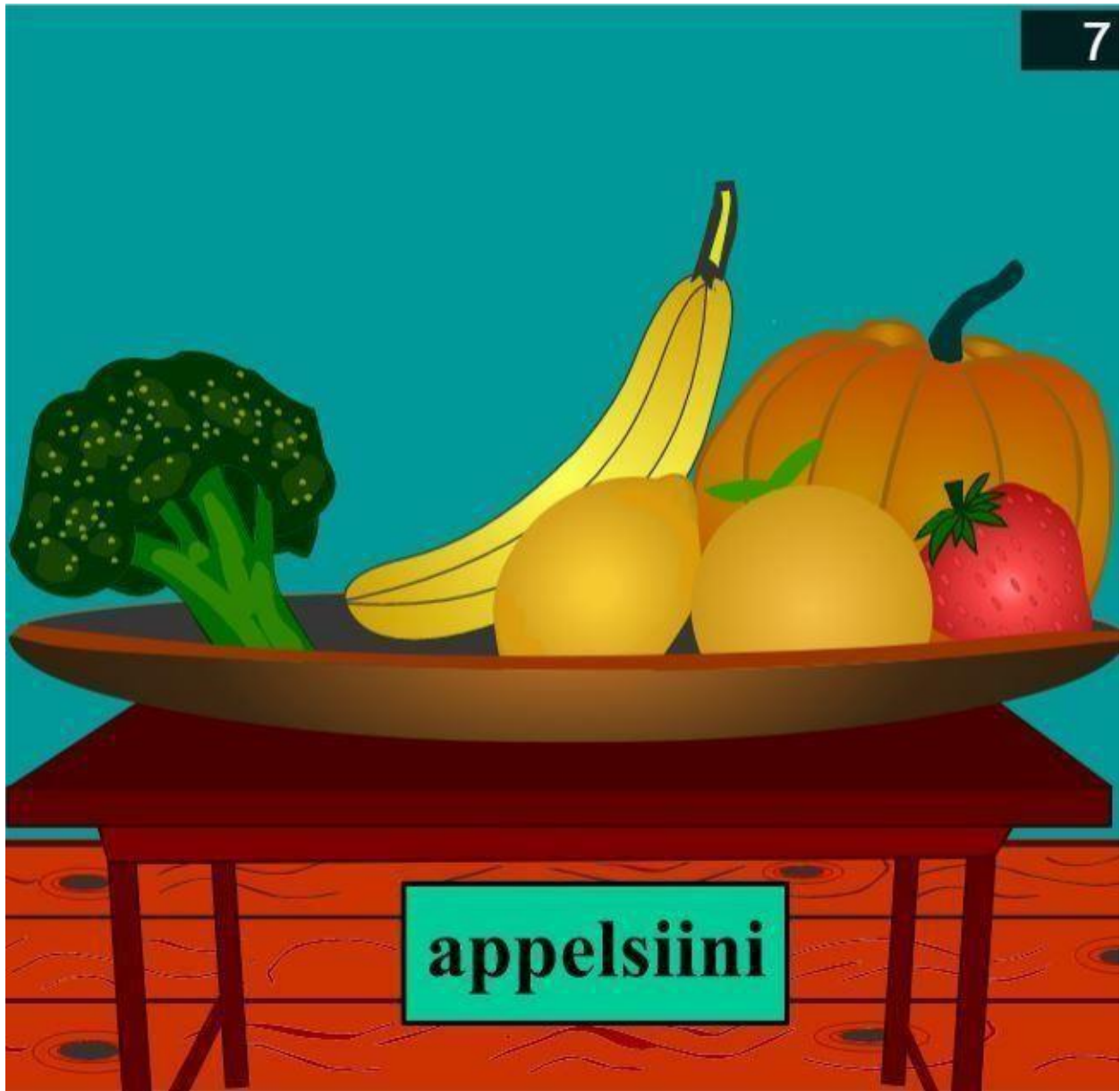


FIGURE 3- Play by selecting a fruit name. (24.)

But if you give wrong answer, it will provide you a lesson on that item to learn about the thing. Then you can begin in the same process again. In Figure 3 and 4, the user can select a fruit on the picture and the correct name of the object appears both in English and Finnish. The game can be continued further to learn more words in Finnish and English.

try again!

49

maissi

(corn/maize)



*FIGURE 4- Correction with description for learning is demonstrated.
(24.)*

4. TYPES OF GAMES

Game developers have designed and created video games for computers and video game consoles. They have included the conception as well as the execution of the game creation. While education requirements vary based on recruitment criteria, many prospective game developers seek a bachelor's degree in computer science, software engineering, or related field. These engineers develop lots of types of games to exercise their skills. There are many popular types of games that can be helpful in terms of learning, and their usefulness in day to day life is approved. The genres and examples are an essential aspect when making a game, as each game can only have one, and the ones you choose can significantly affect sales. Each different type of game costs different amounts to develop, and each has a different popularity with consumers. More importantly, when one combines diverse genres and types, it is possible to make combinations between 2D and 3D games, which can range to several degrees of acceptance. It can be vital to making a top-selling game. The main game types are 2D games, 3D games, and web-based games. (Kairosoft 2015)

1. 2D GAMES

2D graphics are used primarily in traditional technology-based printing applications such as maps, construction drawings, and screens. They are also called platform games because they are held on a platform where player or game character can walk, fight, leap forward, etc. They were developed decades ago and are quite old now. Popular examples of these types of games are Mario series, Subway Surfers, and Angry Birds. In these applications, two-dimensional images not only add representations of real objects but also individual objects with symmetric values; Two-dimensional design allows better control over 3D graphics. 2D models are less than or equal to 1000 digital images. For these reasons, documents and illustrations are usually stored or transferred as 2D graphic files. 2D computer graphics started in the 1950s based on vector graphics. Network-based devices often replace 2D games. (Kairosoft 2015)

2. 3D GAMES

3D graphics or computer graphics differ from 2D computer graphics. 3D games are graphics that are stored on a computer by geometry (mostly Cartesian) data. First, a 2D chart can be drawn on the Cartesian plane. These images can then be viewed. 3D computer graphics are based on many algorithms that resemble 2D computer vector graphics on the wireframe and 2D raster graphics on the final output screen. Computer graphics software sometimes reduces the differences between 2D and 3D. 2D apps use 3D techniques to achieve results such as light 3D and 2D graphics. 3D computer graphics are often alluded to as 3D models. In addition to the graphics displayed, the template is contained in a graphical data file but in any case, they are different applications.

The 3D model is a mathematical representation of a three-dimensional object. The model is not technically graphical until the screen is displayed. A two-dimensional image illustrates the design through a process that uses 3D imaging or schematic and computational simulation simulations. The 3D model of 3D printing is like 3D modeling, and precision output can match virtual models. (Kairosoft 2015)

5. ADVANTAGES OF GAMING

There are many advantages and disadvantages of gaming and learning but advantages outweigh the disadvantages. Gaming can make people smarter, sharper, and more focused. Researchers have found that there are many benefits to gaming. The results from various studies and more explanations based on theories are mentioned below. Complex, challenging, and ambitious video games have come a long way these days and they encourage creativity does lead to a healthy mind, and video games certainly develop creativity. This applies to all types of games.

Most games favor the development of logical thinking to resolve problems by riddles and puzzles. Gaming and learning experience are better if the games are designed in such a way that it is accessible, approachable, and not overwhelming. Gaming streamline makes gamer think to decide because gamers develop long-term ability to calculate effectively the possibilities of many ways of a result, which leads to the best way to go. Playing games enhances the player's awareness of the surroundings, according to research conducted by scientists. (University of Rochester 2010).

The interaction in video games improves the motor skills and hand-eye coordination of preschool children. Cooperative and online games promote sociability, group-work, ability to resolve problems together for both children and adults. (Deakin University 2014)

Video games end physical pain, depression, emotional pain, and aggressive behavior by causing the mind to be distracted. Working with video games is a distraction that changes heart rate and channels frustrations into virtual world. Action video games with accelerated images improve eyesight because of the required attention to it, even in people with cataracts. Games with unique achievements are powerful platforms for change because together, we can create whatever future we imagine. (McGonigal 2013)

Dr. Katherine M. Keyes, Deputy Professor of Epidemiology at Mailman School, who has studied in this field of gaming and learning, said, "Video games are often a collaborative activity for older children." (Bolton 2016) These results show that children often play video games that are socially connected with peers can integrate into the school community. In another case, employers recruited 72 volunteers and measured their cognitive flexibility as the ability to adapt and switch between tasks. Few groups of volunteers were trained to play various versions of a real-time strategy game called StarCraft, a game of speed. One- third of the group plays a life simulation electronic game called The Sims, which does not require much memory or tactics. All volunteers played video games in six to eight weeks for 40 hours. (Bolton, 2016)

Dr. Brian Glass, from the Queen Mary School of Biology and Chemical Sciences, has stated, “Previous studies have shown that implementable video games such as Halo can speed up the decision-making process, but current work shows that real-time strategy is always thinking and learning from past errors. The cognitive flexibility, a cornerstone of human intelligence, is not a static feature but can be trained and improved with linguistic learning tools, as can be inferred from such studies.” Professor Bradley C. Love of UCL, has said: “Cognitive flexibility varies between people and in different age groups.” Problem-solving creativity and thinking outside the box require the perceived flexibility. Perhaps opposing the repetition of the work in the last century, the modern knowledge economy has created cognitive flexibility using artificial intelligence. (Doug Bolton 2016) Dr. Glass has added: “The volunteers who played the most complex version of the video game performed the best in the post-game psychological tests. It is needed to understand now what exactly about these games is influencing these changes, and whether these cognitive boosts are permanent or if they dwindle over time. Once the understanding is achieved, it could raise chances to develop clinical interventions for symptoms related to attention deficit hyperactivity disorder or traumatic brain injuries.” (University of London 2013)

6. DISADVANTAGES

There are a few disadvantages to gaming. Too much use of anything can never be right. Excessive or uncontrolled use of online studying can result in a lack of focus in real life. The purpose of overuse trains the human mind to think in a more competitive way aiming to win always rather than seeking to study and learn. The abuse of online gaming and studying can also result in the loss of human interaction and sharing ideas to create new possibilities that traditional learning ways achieve. There are chances teenagers will no longer be keen to socialize and become even more independent individually. As a result, group study may diminish, and individuals may become even more restrained and socially awkward. However, each of the problem mentioned has a specific solution.

This approach of studying may not appeal to every students or pupil. Avoiding overuse can be achieved by selectively applying the method based on student's need or demand. It is optimal to use game- based learning during leisure periods or while teaching to young children or teenagers. Preventing the appearance of badges or rewards during education can help restore focus to aim in studying rather than losing track to win the game or cross a level only. An important measure throughout is constant monitoring and surveying analytics of the website usage to receive a better experience from learners. Also, besides it shall assist in changing and adapting the game in ways that suit the learner better.

Video games may not be interesting in the daily activities and hobbies for people who lack mental activity. Players can also be isolated because of game addiction and lack of social interaction. If you have spent much time in front of the screen, but there is not enough social interaction, this social problem can trigger the player to be scary and introspective. As the gaming world develops today, it becomes violent and controllable and aggressive. New research has shown that too many video games can inhibit the human brain growth. For example, there is a game that can stimulate brain activity in the left and right hemispheres of the frontal lobe. The frontal lobe of the brain is involved in learning, memory, and emotions and increases at age 20. This level of use of gaming needs to be decreased because the brain develops at this critical time. Misuse or overuse of games continuously may inhibit this development. (Nick Taws 2013)

Computer Vision Syndrome is a condition identified in game addicts due to their addiction of playing on computer or laptop, many computer users will have blurred vision and cause muscle strain in the eye from looking at the computer screen all day. This is not an isolated issue. Instead, it is a series of eye fatigue and pain associated with continuous computer use like cortical tunnel syndrome, where the eyes continue focusing on one thing that can attract the eye muscles. When you read from the screen, the focus is very different online gamer's experiences demonstrate.

In most cases, continuous use of computers or video games can lead to poor eyesight related to computer vision syndrome and can lead to double vision, headaches. Video games can have many disadvantages for children. Video games in which you catch and kill, can increase children's anger and aggressive behavior, in a few cases. The use of violent games can stimulate humans, and their uncontrollable emotions may bring them closer to bad behavior and cold behavior. Violent behavior may cause some people to be indifferent when this type of event is encountered or be less responsive. (Anderson and Bushman 2001)

7. DEVELOPING A STUDY BASED GAMING WEBSITE

Study-based gaming is a unique, categorized gaming system that helps to learn. The learning process can be approached by various types of quizzes, flashcards, puzzle-based games. A study-based gaming website can be an ideal place for the next generation learning system. In this thesis, the stages of designing and developing a study-based gaming website will be discussed too.

1. DOMAIN REGISTRATION

A domain name is a webpage address where internet users can access the website. "A domain name is used for finding and identifying computers on the Internet." (Website.com 2019) PCs use IP addresses, which are a series of numbers. However, it is difficult for us to remember a set of numbers. Because of this, domain names were developed and used to identify entities on the Internet rather than using IP addresses.

A domain name can be any combination of letters and numbers, and it can be used in conjunction with the various domain name extensions, such as .com, .net, and more." (website.com, 2019). You can use a word or phrase as the name of domain. If the domain is for a company, you might want to put the company name in the domain, and this makes it easier for your customers to find you on the Internet. Although a more extended domain is harder to remember, it can contain more keywords, which is essential as some of the search engines use keywords in a domain name as part of the search algorithm. But avoid the use of domain names that are too long, they are difficult to remember and prone to user input mistakes. If your preferred domain name is not available, try adding a prefix, such as "my" or "the." And finally, it must be made sure that the domain name can be verbally communicated. You do not want to repeat or spell it out always. The Internet Corporation controls the domain name registration system for Assigned Names and Numbers (ICANN). The internet can identify only IP addresses. Domain name server (DNS) is used to keep relations between a domain name and numerical IP addresses.

TLD, or Top-Level Domain, is the part of the domain name on the right of the dot ("."). The most common TLDs are .com, .net, .org.

There are various types:

gTLD - a generic top-level domain

.com

.org - typically for organizations

.net

.edu - restricted for post-secondary educational establishments

.mil - restricted for US military

.gov - restricted for US governments and agencies

.int - restricted for international organizations established by treaty

uTLD - unsponsored top level domains

.info - for informational sites

.name - for families and individuals

.biz - for businesses

.mobi - reserved for websites catering to mobile devices

.travel - reserved for travel agents, airlines, tourism bureaus, and hoteliers

ccTLD - country code top-level domains

.ca - for Canada

.uk - for the UK

.fr - for France

Almost every nation has a country domain. When selecting your domain extension, decide if you are targeting a local country or if you are planning to go worldwide. ccTLDs are a great choice if you need to publish and market your business to a certain geographic region. (website.com 2019, date of retrieval 12.03.2019) For the targeted website in this thesis, a domain name www.gameforlearn.com has been registered. One can access the website through the domain name. The domain from www.godaddy.com was registered for this study-based gaming website as shown in Figure 5.

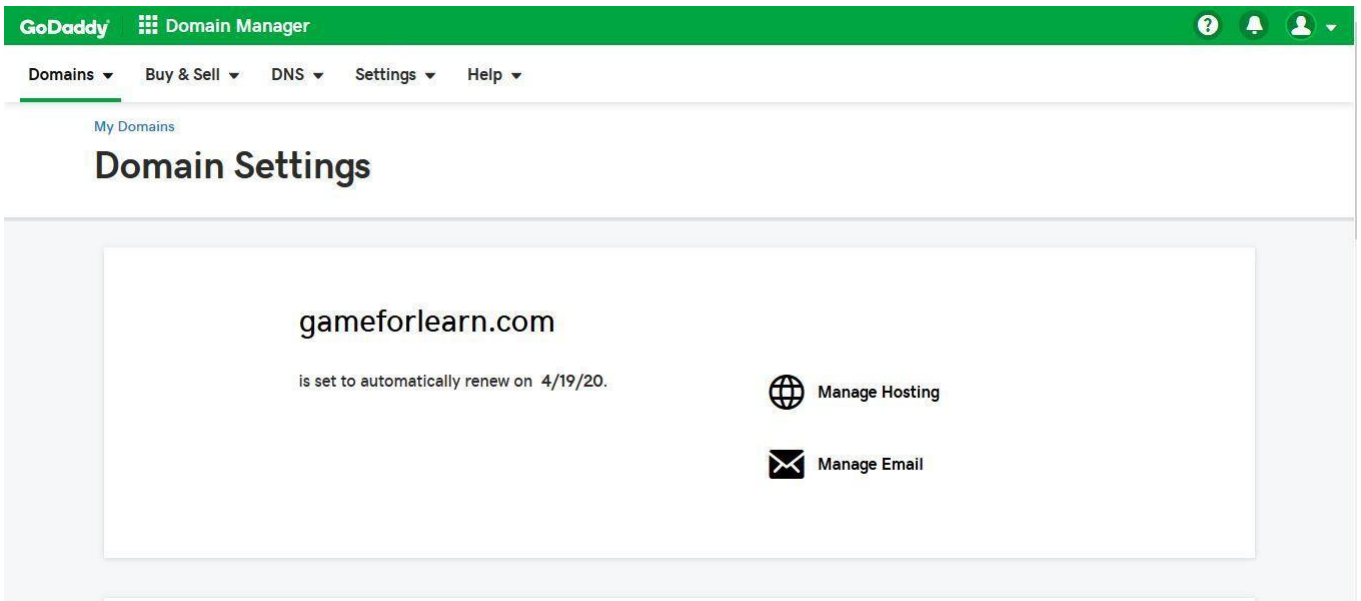


FIGURE 5- Domain Dashboard. (25.)

2. WEB HOSTING

"Web hosting is a service that allows organizations and individuals to post a website or web page onto the Internet. A web host, or web hosting service provider, is a business that provides the technologies and services needed for the website or webpage to be viewed on the Internet. Websites are hosted or stored on individual computers called servers. If Internet users want to access their website, all they need to do is type in your browser's website address or domain. Their computer connects to your server, and your webpages are being delivered to them through the browser. Most hosting companies demand that you should have your domain to host with them. If you do not have a domain, the hosting companies show you how to purchase one." Figure 6 summarizes the webhosting features.

(website.com 2019, date of retrieval 12.03.2019)



FIGURE 6- Web Hosting features. (12)

There are several different types of web hosting plans which include the following:

- Shared hosting – This is usually recommended for new websites, as it is the most economical way to start a website.
To share the infrastructure, the page is put on a network with other sites.
- VPS hosting - Recommended for more advanced users, and those not supported by shared hosting having to download different products or apps. The owner’s website is placed on a server with other websites, like shared hosting, but typically, there are fewer websites per server. It also includes root or admin access to its operating system installation in a virtualized environment.
- Dedicated servers - When you get a dedicated server, your website(s) get access to the full server, since it is not shared with any other users. It also includes whole root or admin access like a VPS. This is the recommended route not available in a shared hosting environment for websites with lots of visitors (traffic) or custom requirements.

- Reseller hosting - This service is designed for webmasters or others who want their web hosting service to be resold. It is also a feasible choice for people with multiple websites, as it allows the management of many sites under one control panel.
(hostgator.com 2019, Date of retrieval 15.03.2019)

For the website mentioned in the thesis, a Linux hosting was used from www.godaddy.com. This plan includes 10GB SSD storage with 25K monthly visitors.

The screenshot shows a web hosting management interface. At the top, there's a navigation bar with 'Overview' and 'Customize' tabs, and a 'Launch Control Center' button. The main content area displays the current plan: 'Economy Linux Hosting with cPanel' for \$8.99/mo. An 'Upgrade' button is visible, leading to a comparison table between the current plan and a 'Deluxe Linux Hosting with cPanel' plan for \$11.99/mo. The table lists resources like Site Visitors, RAM, Storage, and MySQL Databases. At the bottom, there are options to renew for 12 months at \$8.99/mo and buttons for 'Renew' and 'Upgrade'.

Resource	Economy Linux Hosting with cPanel (\$8.99/mo)	Deluxe Linux Hosting with cPanel (\$11.99/mo)
Resources	Shared	Shared
Site Visitors	Low	Moderate
RAM	Shared	Shared
Storage	Shared	Shared
MySQL Databases	10	25

FIGURE 7- Web Hosting Plan Details. (10.)

3. **REACT AS WEB FRAMEWORK**

This website used in this thesis can be built using React, which is widely accepted these days. It is easy to use and fast. Using React, one can further extend to build mobile apps on both Android and iOS operating systems. It gives better user experiences. Building app with React is economical, and unlike WordPress does not require paid themes or plugins. The website React.express is a great website to learn the basics and get started. React is a JavaScript library that was made by Facebook. React is a User Interface (UI) library that is used to build UI components while developing a website.

4. **START WITH REACT**

To develop React.js on a local computer, one needs to work on our laptop as a localhost. Hence, it needs Node.js software to be downloaded to work as a localhost for React to operate. Figure 8 shows the installation procedure. It was downloaded from <https://nodejs.org/en/>. The Figure 7 demonstrates the plan and purchase details.

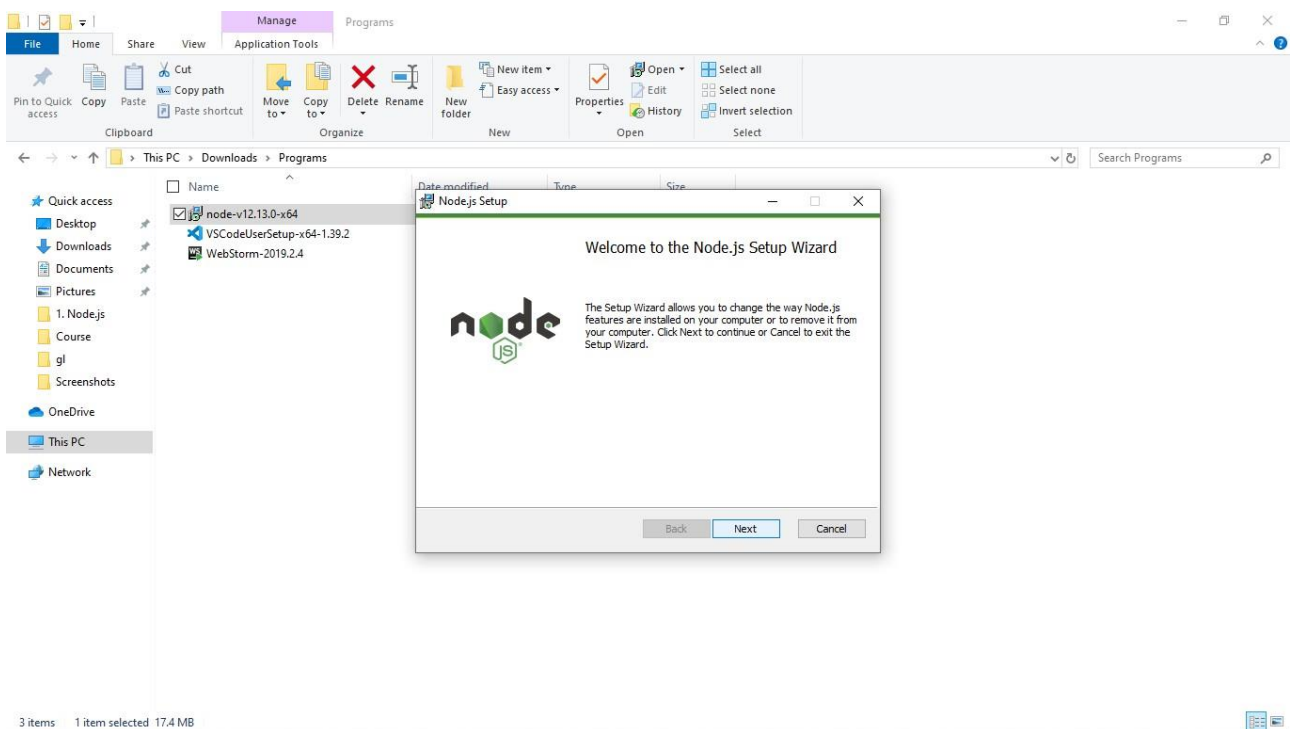


FIGURE 8 - Node.js installation. (21)

Further, we need an IDE or Code Editor to write the react.js code. We can use Visual Studio Code, Webstrom, etc. software. In this project, the author has used Webstrom. The link to download is - <https://www.jetbrains.com/webstorm/download/>.

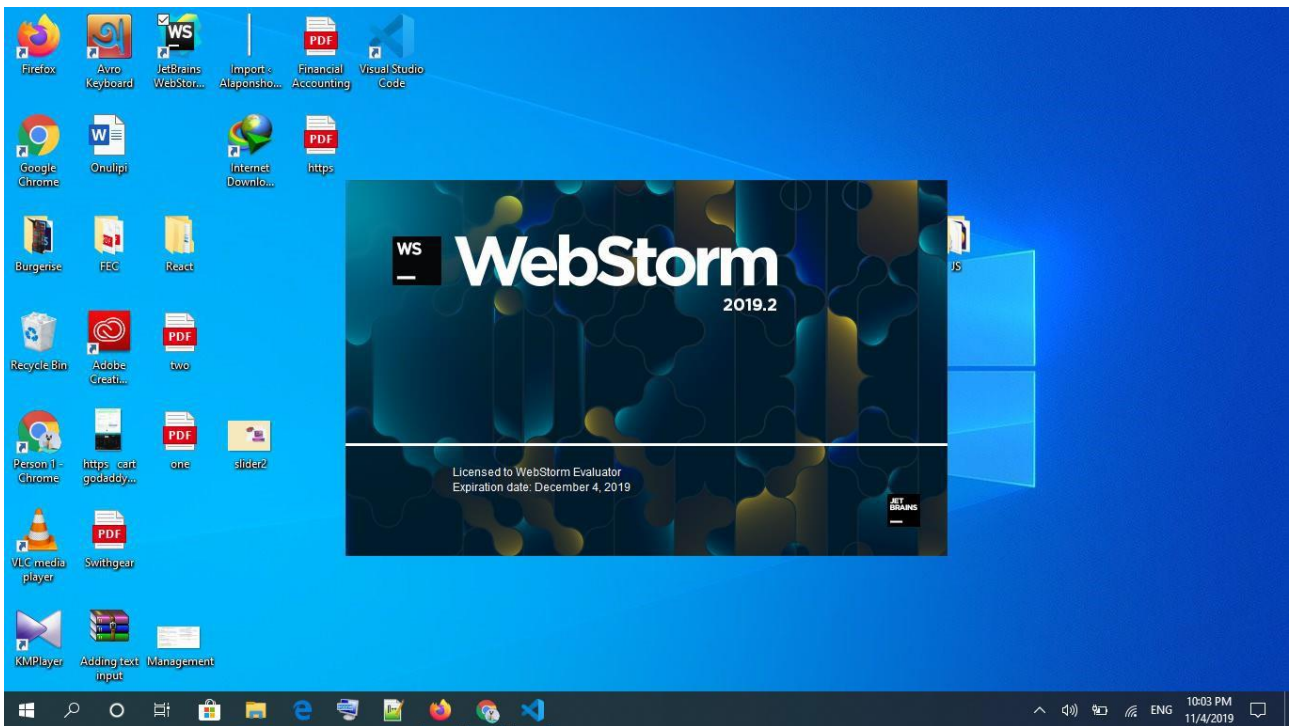


FIGURE 9 - Webstorm installation. (19)

5. DESIGN AND DEVELOPMENT

Firstly, the react app is created by using node.js and WebStrom application. The preview of built files can be checked by using 'npm' start command on the terminal. This will show the preview of the demo app created by react installation on the default browser of the local computer.

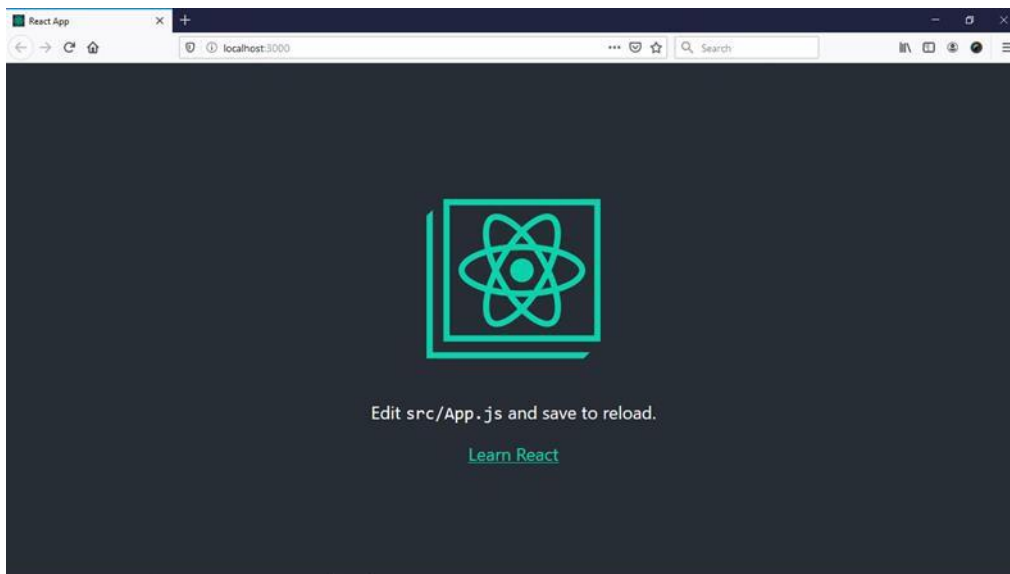


FIGURE 10 - Demo app created by react installation.

On WebStrom, the default installation files can be checked. There are three directories –

- a) Node modules: This directory contains the react library files.
- b) Public: This directory includes index.html files.
- c) Src: The src directory list contains all JavaScript, CSS, and other data.

The index.html file in public directory is linked with src directory on index.js file by document.getElementById method. The index.js file shows the content of ‘function app()’ from app.js.

To start the development of the desired application, the demo content in app.js is needed to be removed. This will create a totally blank page on app preview on browser. Following that, we must start following the basic design structure for the desired app.

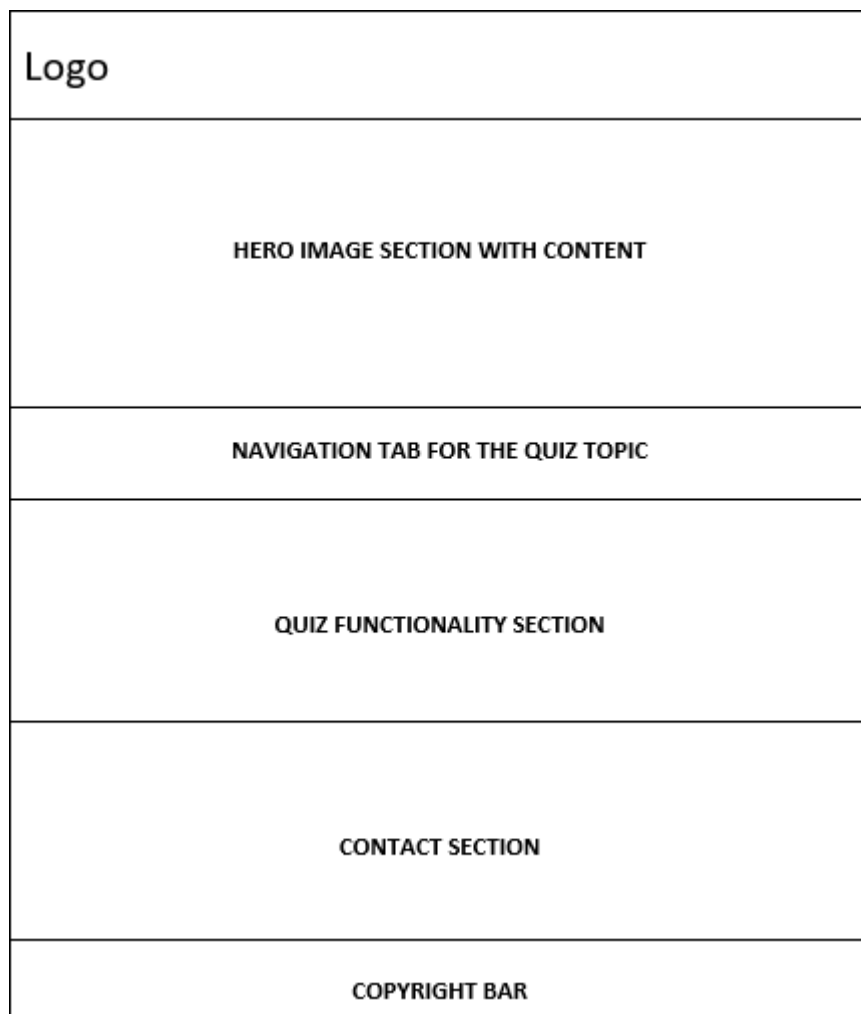


FIGURE 11 - Design structure of gameforlearn.com

To build the logo section a new JavaScript file called navigation.js is created on src/components directory. In navigation.js file, a class called 'Navigation' was created using react Component library. Then render and return method was used to return the content. In the return method a <div/> tag is used. In the <div/> tag <Navbar/> tag is used to contain the logo image. <Navbar/> style is imported by using react-bootstrap. The Navigation class can be used for creating a full navigation bar. To connect the section with index.html a <Navigation/> class tag is imported and used in the App.js file. The next target is creating the hero section. To create the section, a new JavaScript file named Hero.js was created on src/components directory. A new arrow function called 'Hero' was created in Hero.js. In 'Hero' function a <styles/> tag is imported from 'styled-components' library. A <jumbotron/> from react-bootstrap is used to design the section. An object called 'style' and a class called 'jamboree' are used to style the hero section. All the other content was added by using different basic JSX tags on the container. The section is connected with index.html by importing and using <Hero/> function tag in the App.js file.

```

1 import React from 'react';
2 import { Jumbotron, Container } from 'react-bootstrap';
3 import styled from 'styled-components';
4 import banner from './assets/images/hero.jpg';
5
6 const style = styled.div`
7   .jamboree {
8     background: url(${banner});
9     background-repeat: no-repeat;
10    background-position: bottom;
11    background-size: cover;
12    height: 500px;
13    position: relative;
14    z-index: -2;
15  }
16 `;
17
18 const Hero = () => {
19   <Styles>
20     <jumbotron fluid className="jamboree">
21       <Container>
22         <h4 style={{color: "red"}}>LEARNING IS FUN</h4>
23         <h1 style={{color: "blue", padding: "10px"}}>Game for Learn</h1>
24         <p style={{color: "black", padding: "10px", fontSize: "18px"}}>We are with innovative to making your learning easier.</p>
25         <p style={{color: "black", padding: "10px", fontSize: "18px"}}>You can learn by quiz game.</p>
26         <button className="btn btn-success" size="lg">Click Below to Start</button>
27       </Container>
28     </Jumbotron>
29   </Styles>
30 }

```

FIGURE 12 - Code structure of Hero.js.

Next, the quizzes were created using react Hooks. Four different JavaScript files called Science.js, Maths.js, Ict.js and History.js on src/components/Quiztype directory added. All four files contain same type of data with separate questions and answers. In every file, there was a function created on their name. In these functions, the view was created in the return method.

In return, the first content was done using a header file to show the number of questions. For this, an additional JavaScript file was created on `src/components/Quiztype/components` directory called `Steps.js`. The `Question.js` file on `src/components/Quiztype/components` directory controls the view of question name in return method.

In the next view of the return method, the answers are added using the JSX button tag. The answer view was controlled by creating a new JavaScript file called `answer.js` on `src/components/Quiztype/components` directory. The last view of the return method is a 'next/restart' button.

The on click answer button and next/restart button was controlled by different object and function. A set of question and answer array was attached to each quiz topic. The correct answer validation was done by adding a JavaScript file called `Answerlist.js` on `src/components/Quiztype/components`. A context object was added on `Quizcontext.js`.

To ensure the set answer on answer button, an additional switch case operator was added in `Quizreducer.js` file to `Quiztype/components` directory. Finally, a conditional if-else statement in each quiz topic JavaScript file to control the view of the quiz section. To create the navigation tab section for the quiz, the `react-router-dom` library was used. For the section, a new JavaScript file called `Home.js` was created on `src/components` directory. Then a class 'Home' was built using `react Component` library demonstrated in Figure 12,13 and 14. The `Route`, `Navlink`, `Hashrouter` were imported from `react-router-dom` library. In the 'Home' class a `render` and a `return` method were created. The `<Hashrouter/>` tag was used in return method to create the navigation tab. All the quiz type JavaScript file `Science.js`, `Math.js`, `Hisory.js`, `Ict.js` were imported in `Home.js` to use in Navigation bar. `React-router <Route/>` tag was used to select the path. Finally, the `Home.js` file was exported to `App.js`. A new class tag `<Home/>` was added in `App.js` to connect with `index.html`.

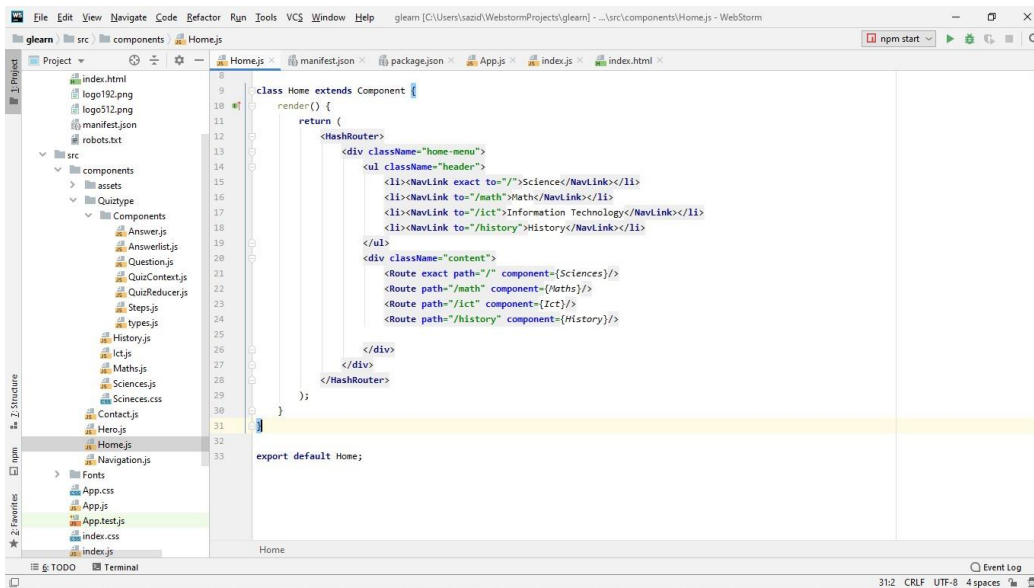


FIGURE 13 - Code structure of Home.js.

For the contact section, a new JavaScript file called Contact.js was added on src/components directory. There a class named 'Contact' was added using the react Component library. In return method, two header files and a mail-to button were added. The Contact.js was then exported to App.js. An <Contact/> tag is added in App.js to connect with index.html. The last copyright bar is directly added in App.js by a header file.

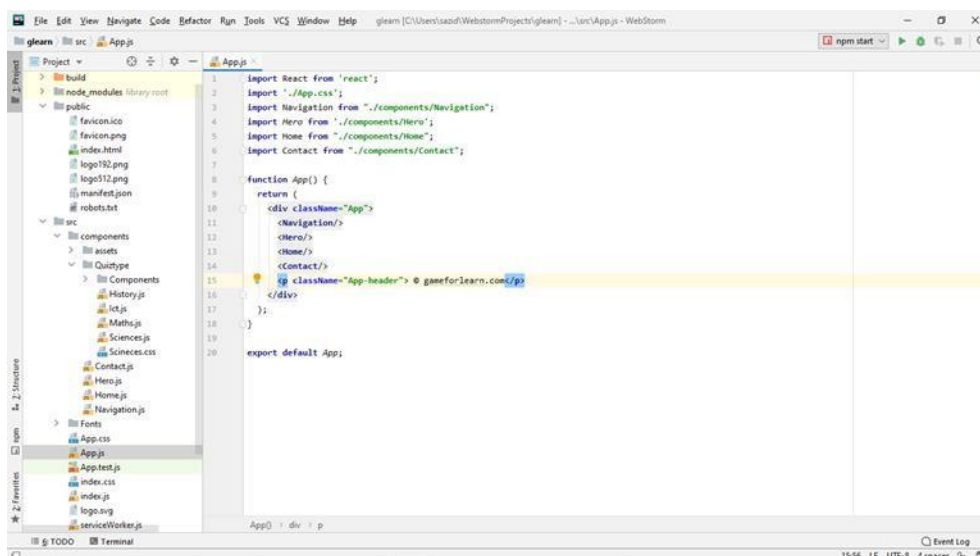


FIGURE 14 - Code structure of App.js.

In the app, all image files were imported from src/components/asset/images directory. CSS, react-bootstrap, styled-components were used for styling.

6. MAKING REACT APP LIVE

The react game designed is needed to upload and host on the live server to be accessible to everyone. The react app was built using WebStrom. To do this, it was necessary to open the terminal and write the command 'npm run build'.

Using the following steps we can upload the react app to live server.

1. Run the terminal from Webstrom. Then type "npm build run." This will create a build file on the local files directory.
2. Zip the local file.
3. Then log in to Cpanel and file manager.
4. Go to the public-html directory.
5. Upload the zip file into public-html.
6. Then extract the zip file.
7. Finally, the react js project is live. It can be accessed to browse.

The primary purpose of www.gameforlearn.com is to give users learning content with games. The design is based on the target. Players can find the game category easily, which are various subjects. They can click the category button for the desired games.

8. CONCLUSION

Finally, gaming for studying or learning something has already been recognized as a new trend for students as well as teachers globally. Gaming releases endorphins, which enhances mood immediately. Most subjects can be learned with gaming easier than traditional studies which involves repeatedly reading information from books. Moreover, studies have shown that most of the new generation are already dependent on gaming, and the world's education planners are busy creating a vital and beneficial relationship between study and games. Furthermore, it is time to think out of the box. Everyday thousands of students worldwide are quitting their studies because of their additional burden. So, if the study planners or educators can discover an attractive and catchy method for our students, then the percentage of college dropouts could perhaps be smaller.

On the other hand, the generation X now is used to technology, and they have the willingness to accept new things rather than relying on traditional ways of learning. Because of this, it is difficult to match with new learning systems for them, and as technology progresses, we can get full benefits of it by using it in every step of our daily life. In another aspect, most teens have access to upgraded devices like smartphones, tabs, laptops, and other smart devices already, and it is continually rising because of booming technology. Our future generation will be more and more gadget dependent. Therefore, it might be necessary to adjust or reform the learning experience. Also, the use of technology and gaming in teaching should be encouraged because they can be beneficial to learning processes and change the concept of a learning experience.

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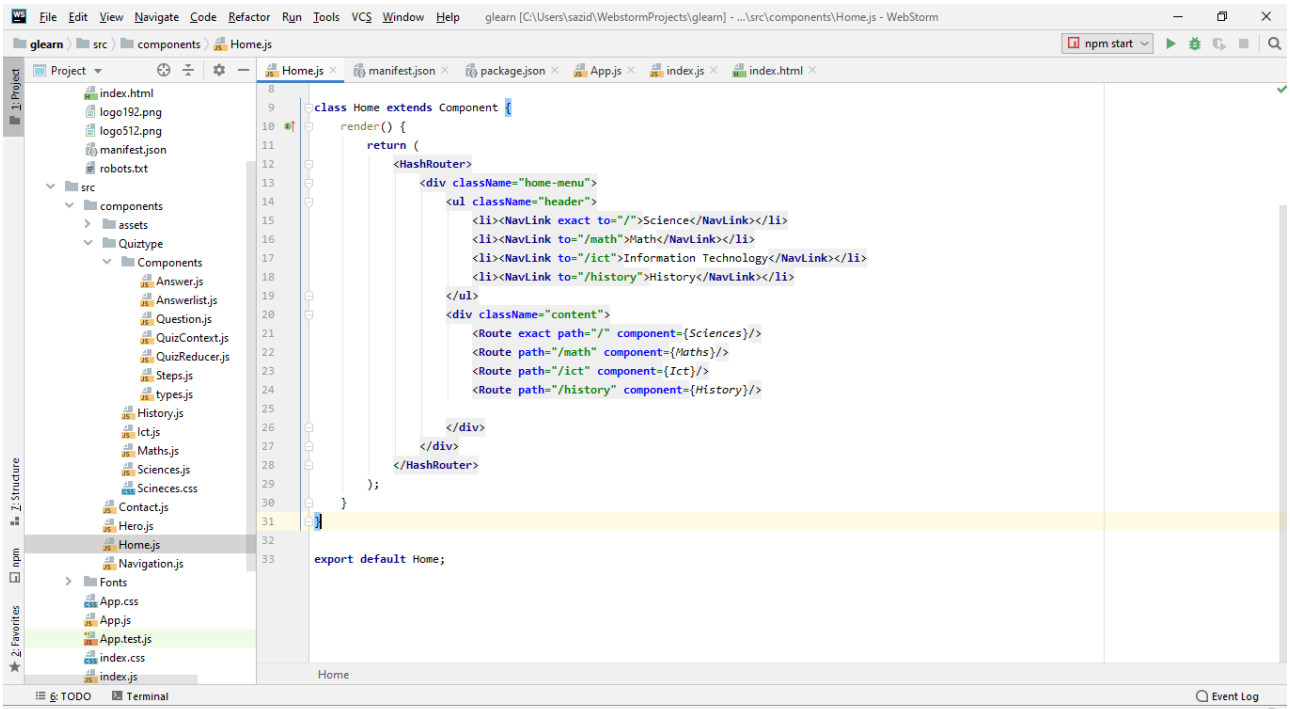
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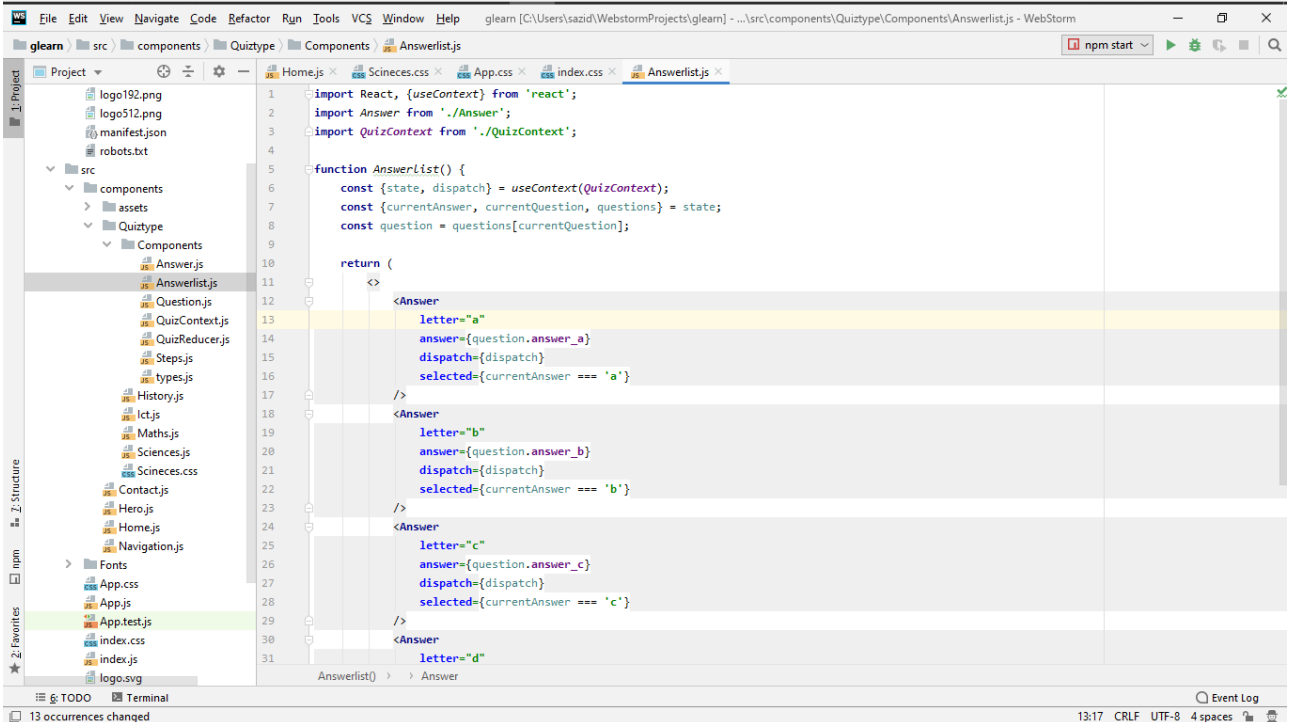
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<http://www.gameforlearn.com/>



```
8 class Home extends Component {
9   render() {
10    return (
11      <HashRouter>
12        <div className="home-menu">
13          <ul className="header">
14            <li><NavLink exact to="/">Science</NavLink></li>
15            <li><NavLink to="/math">Math</NavLink></li>
16            <li><NavLink to="/ict">Information Technology</NavLink></li>
17            <li><NavLink to="/history">History</NavLink></li>
18          </ul>
19          <div className="content">
20            <Route exact path="/" component={Sciences}/>
21            <Route path="/math" component={Maths}/>
22            <Route path="/ict" component={Ict}/>
23            <Route path="/history" component={History}/>
24          </div>
25        </div>
26      </HashRouter>
27    );
28  }
29 }
30
31 export default Home;
```



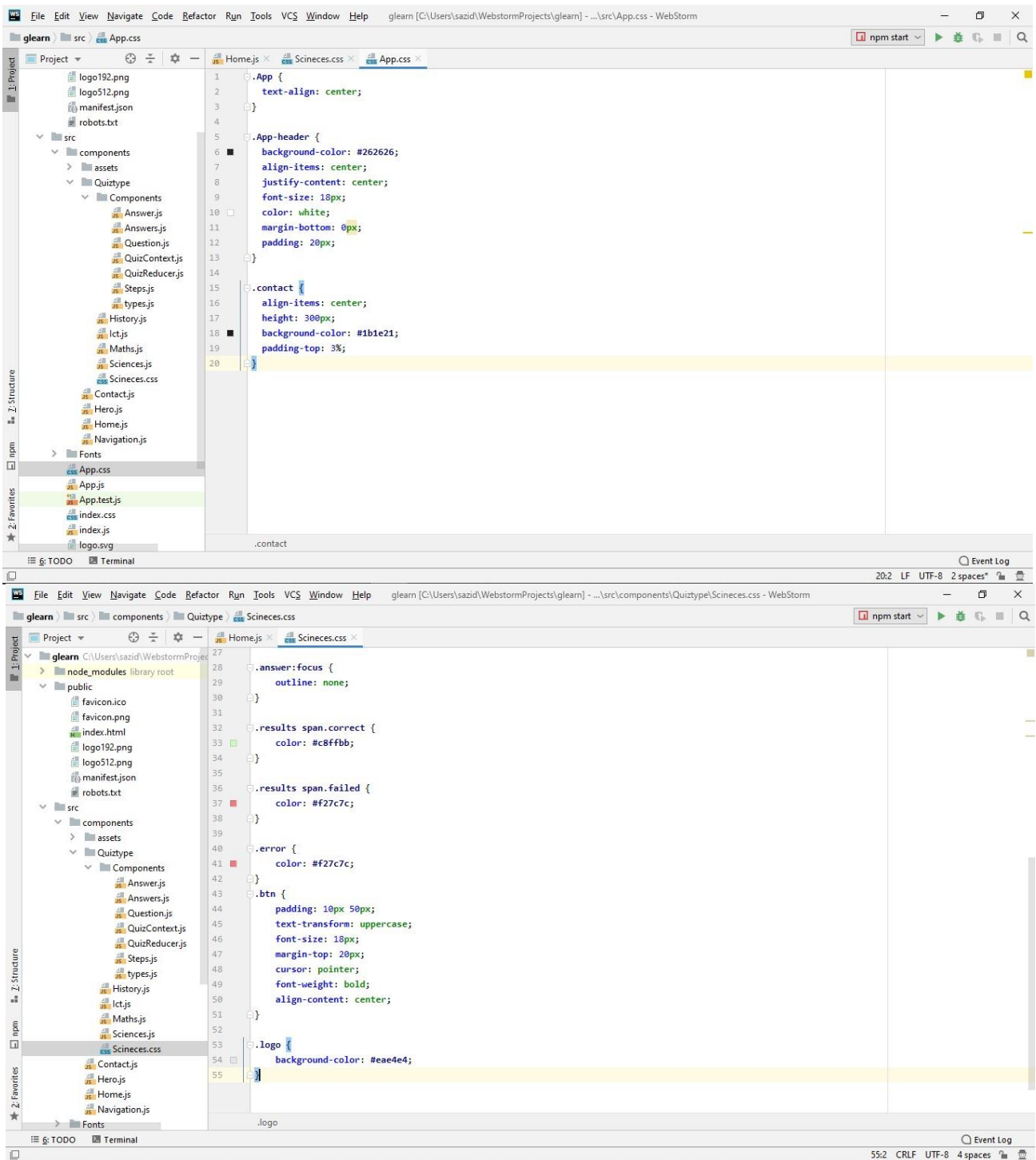
```
1 import React, {useContext} from 'react';
2 import Answer from './Answer';
3 import QuizContext from './QuizContext';
4
5 function Answerlist() {
6   const {state, dispatch} = useContext(QuizContext);
7   const {currentAnswer, currentQuestion, questions} = state;
8   const question = questions[currentQuestion];
9
10  return (
11    <>
12      <Answer
13        letter="a"
14        answer={question.answer_a}
15        dispatch={dispatch}
16        selected={currentAnswer === 'a'}
17      />
18      <Answer
19        letter="b"
20        answer={question.answer_b}
21        dispatch={dispatch}
22        selected={currentAnswer === 'b'}
23      />
24      <Answer
25        letter="c"
26        answer={question.answer_c}
27        dispatch={dispatch}
28        selected={currentAnswer === 'c'}
29      />
30      <Answer
31        letter="d"
32      />
33    </>
34  );
35 }
```

```
File Edit View Navigate Code Refactor Run Tools VCS Window Help gleam [C:\Users\sazid\WebstormProjects\gleam] - ...src\index.css - WebStorm
gleam src index.css npm start
Project Home.js Scineces.css App.css index.css
logo192.png
logo512.png
manifest.json
robots.txt
src
  components
    assets
    Quiztype
      Components
        Answer.js
        Answers.js
        Question.js
        QuizContext.js
        QuizReducer.js
        Steps.js
        types.js
        History.js
        Ict.js
        Maths.js
        Sciences.js
        Scineces.css
        Contact.js
        Hero.js
        Home.js
        Navigation.js
    Fonts
    App.css
    App.js
    App.test.js
    index.css
    index.js
    logo.svg
```

```
1 body {
2   margin: 0;
3   -webkit-font-smoothing: antialiased;
4   -moz-osx-font-smoothing: grayscale;
5 }
6
7 @font-face {
8   font-family: 'Open Sans', sans-serif;
9   src: local("Open Sans"), url("../Fonts/OpenSans-Regular.ttf");
10 }
11
12 code {
13   font-family: source-code-pro, Menlo, Monaco, Consolas, "Courier New",
14     monospace;
15 }
16
17 h1, h2, p, ul, li {
18   font-family: sans-serif;
19 }
20
21 ul.header li {
22   display: inline;
23   list-style-type: none;
24   margin: 0;
25 }
26
27 ul.header {
28   background-color: #111;
29   padding: 0;
30 }
31
32 ul.header li a {
33   color: #FFF;
34   font-weight: bold;
35 }
```

```
File Edit View Navigate Code Refactor Run Tools VCS Window Help gleam [C:\Users\sazid\WebstormProjects\gleam] - ...src\index.css - WebStorm
gleam src index.css npm start
Project Home.js Scineces.css App.css index.css
logo192.png
logo512.png
manifest.json
robots.txt
src
  components
    assets
    Quiztype
      Components
        Answer.js
        Answers.js
        Question.js
        QuizContext.js
        QuizReducer.js
        Steps.js
        types.js
        History.js
        Ict.js
        Maths.js
        Sciences.js
        Scineces.css
        Contact.js
        Hero.js
        Home.js
        Navigation.js
    Fonts
    App.css
    App.js
    App.test.js
    index.css
    index.js
    logo.svg
```

```
28 }
29
30 ul.header li a {
31   color: #FFF;
32   font-weight: bold;
33   text-decoration: none;
34   padding: 20px;
35   display: inline-block;
36 }
37
38 .content {
39   background-color: #FFF;
40   padding: 20px;
41 }
42
43 .content h2 {
44   padding: 0;
45   margin: 0;
46 }
47
48 .content li {
49   margin-bottom: 10px;
50 }
51
52 .active {
53   background-color: #ffc107;
54 }
55
56 .home-menu {
57   margin-top: -32px;
58 }
59
```



The screenshot shows the VS Code editor with the file `types.js` open. The code defines several action constants for a Redux application:

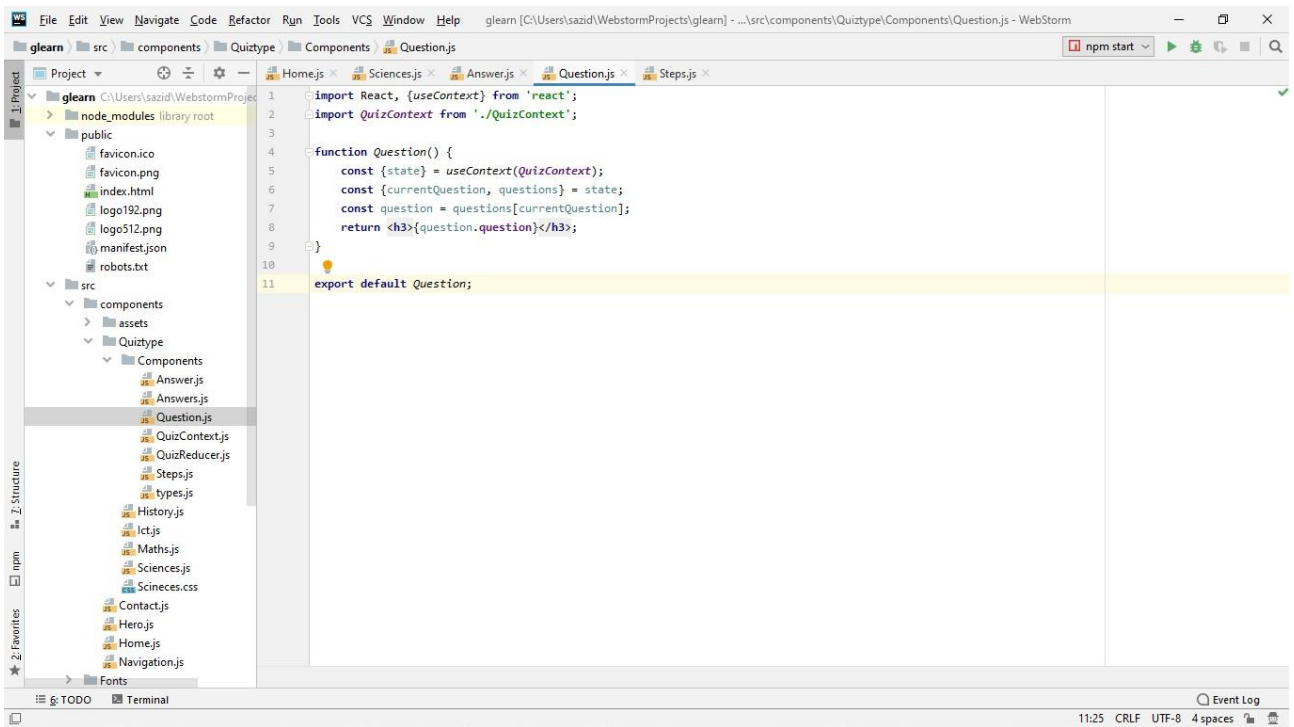
```
1 export const SET_CURRENT_ANSWER = 'SET_CURRENT_ANSWER';
2 export const SET_CURRENT_QUESTION = 'SET_CURRENT_QUESTION';
3 export const SET_ERROR = 'SET_ERROR';
4 export const SET_SHOW_RESULTS = 'SET_SHOW_RESULTS';
5 export const SET_ANSWERS = 'SET_ANSWERS';
6 export const RESET_QUIZ = 'RESET_QUIZ';
```

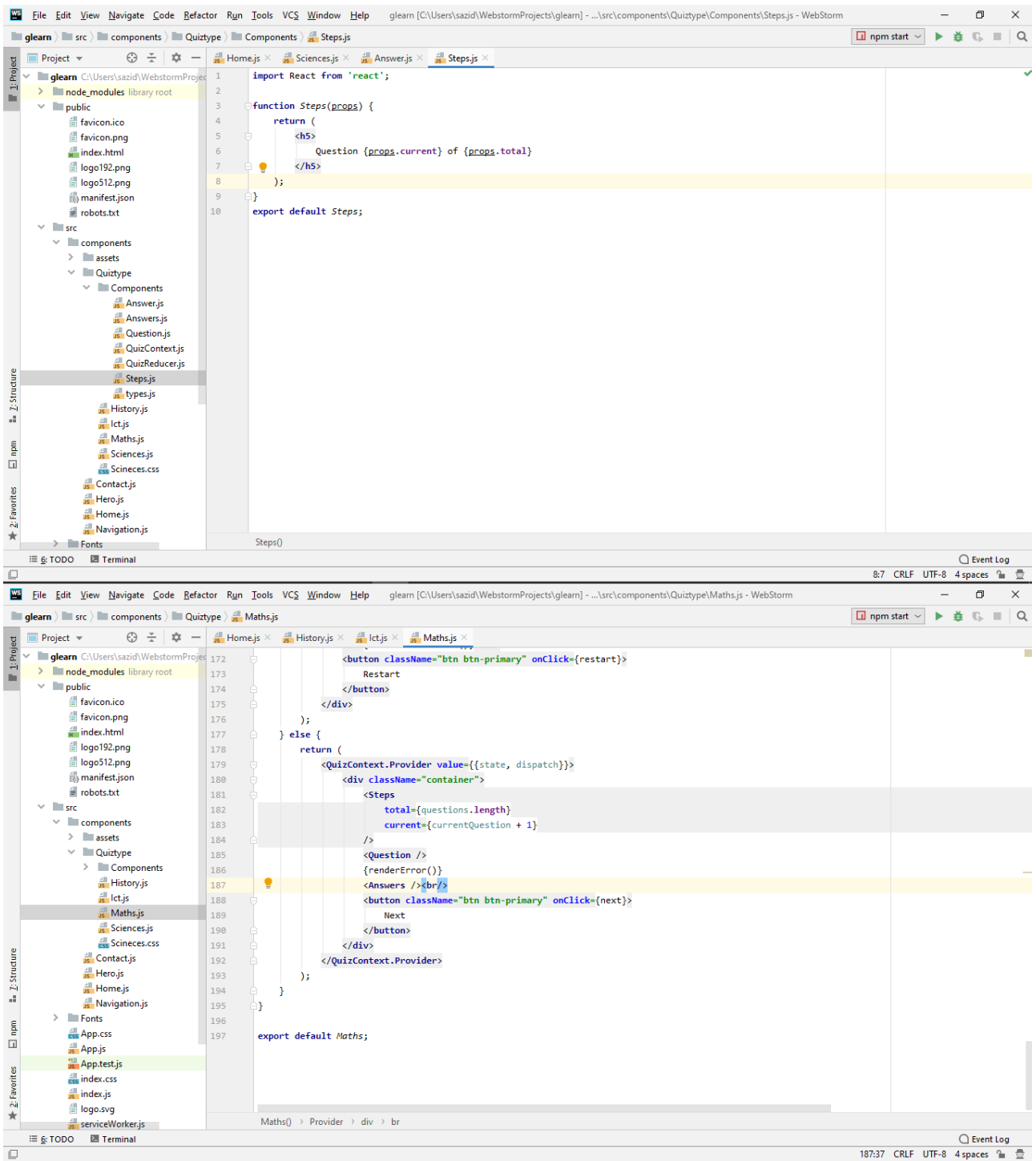
The file explorer on the left shows the project structure, with `types.js` selected under `src/components/Quiztype/Components`. The terminal at the bottom is empty.

The screenshot shows the VS Code editor with the file `QuizReducer.js` open. The code defines a Redux reducer function:

```
8 import { from './types.js';
9
10 function quizReducer(state, action) {
11   switch (action.type) {
12     case SET_CURRENT_ANSWER:
13     return {
14       ...state,
15       currentAnswer: action.currentAnswer,
16     };
17     case SET_CURRENT_QUESTION:
18     return {
19       ...state,
20       currentQuestion: action.currentQuestion,
21     };
22     case SET_ERROR:
23     return {
24       ...state,
25       error: action.error,
26     };
27     case SET_SHOW_RESULTS:
28     return {
29       ...state,
30       showResults: action.showResults,
31     };
32     case SET_ANSWERS:
33     return {
34       ...state,
35       answers: action.answers,
36     };
37     case RESET_QUIZ:
38     return {
```

The file explorer on the left shows the project structure, with `QuizReducer.js` selected under `src/components/Quiztype/Components`. The terminal at the bottom shows the time 8:21 and encoding UTF-8.






```

File Edit View Navigate Code Refactor Run Tools VCS Window Help glearn [C:\Users\sazid\WebstormProjects\glearn] - ...src\components\Quiztype\Ictjs - WebStorm
glearn | src | components | Quiztype | Ictjs | npm start
Project | Homejs | Historyjs | Ictjs
171 <ul>{renderResultsData()}</ul>
172 <button className="btn btn-primary" onClick={restart}>
173 Restart
174 </button>
175 </div>
176 );
177 } else {
178 return (
179 <QuizContext.Provider value={{state, dispatch}}>
180 <div className="container">
181 <Steps
182 total={questions.length}
183 current={currentQuestion + 1}
184 />
185 <Question />
186 {renderError()}
187 <Answers /><br/>
188 <button className="btn btn-primary" onClick={next}>
189 Next
190 </button>
191 </div>
192 </QuizContext.Provider>
193 );
194 }
195 }
196
197 export default Ict;
Ict() > Provider > div > br

```

```

File Edit View Navigate Code Refactor Run Tools VCS Window Help glearn [C:\Users\sazid\WebstormProjects\glearn] - ...src\components\Quiztype\Historyjs - WebStorm
glearn | src | components | Quiztype | Historyjs | npm start
Project | Homejs | Historyjs
171 <ul>{renderResultsData()}</ul>
172 <button className="btn btn-primary" onClick={restart}>
173 Restart
174 </button>
175 </div>
176 );
177 } else {
178 return (
179 <QuizContext.Provider value={{state, dispatch}}>
180 <div className="container">
181 <Steps
182 total={questions.length}
183 current={currentQuestion + 1}
184 />
185 <Question />
186 {renderError()}
187 <Answers /><br/>
188 <button className="btn btn-primary" onClick={next}>
189 Next
190 </button>
191 </div>
192 </QuizContext.Provider>
193 );
194 }
195 }
196
197 export default History;
History() > Provider > div > br

```

```

File Edit View Navigate Code Refactor Run Tools VCS Window Help glearn [C:\Users\sazid\WebstormProjects\glearn] - ...src\components>Contact.js - WebStorm
glearn | src | components | Contact.js | npm start
Project | glearn | node_modules | library root | public | src | components | Contact.js
1 import React, {Component} from 'react';
2 import './App.css'
3 import {Link} from 'react-router-dom'
4
5 class Contact extends Component {
6   render() {
7     return (
8       <div className="contact">
9         <h1 style={{color: "#ffffff"}}>Contact Us</h1>
10        <h3 style={{color: "#ffffff"}}>Mail : info@gameforlearn.com</h3>
11        <a href="mailto:info@maeforlearn.com">
12          <button type="button" className="btn btn-info">Contact</button>
13        </a>
14      </div>
15    )
16  }
17 }
18
19 export default Contact;

```

```

File Edit View Navigate Code Refactor Run Tools VCS Window Help glearn [C:\Users\sazid\WebstormProjects\glearn] - ...src\components\Hero.js - WebStorm
glearn | src | components | Hero.js | npm start
Project | glearn | node_modules | library root | public | src | components | Hero.js
1 import React from 'react';
2 import { Jumbotron, Container } from 'react-bootstrap';
3 import styled from 'styled-components';
4 import banner from './assets/images/hero.jpg';
5
6 const Styles = styled.div`
7   .jamboree {
8     background: url(${banner});
9     background-repeat: no-repeat;
10    background-position: bottom;
11    background-size: cover;
12    height: 500px;
13    position: relative;
14    z-index: -2;
15  }
16 `;
17
18 const Hero = () => (
19   <Styles>
20     <Jumbotron fluid className="jamboree">
21       <Container>
22         <h4 style={{color: "red"}}>LEARNING IS FUN</h4>
23         <h1 style={{color: "blue", padding: "10px"}}><b>Game for Learn!</b></h1>
24         <p style={{color: "black", padding: "10px", font: "18px"}}>We are with innovative to making your learning easier.</p>
25         <p style={{color: "black", font: "18px"}}>You can learn by quiz game.</p>
26         <button className="btn btn-success" size="lg">Click Below to Start</button>
27       </Container>
28     </Jumbotron>
29   </Styles>
30 )
31

```

```
File Edit View Navigate Code Refactor Run Tools VCS Window Help glearn [C:\Users\sazid\WebstormProjects\glearn] - ...src\components\Navigation.js - WebStorm
glearn src components Navigation.js npm start
Project glearn C:\Users\sazid\WebstormProjects\glearn
node_modules library root
public
  favicon.ico
  favicon.png
  index.html
  logo192.png
  logo512.png
  manifest.json
  robots.txt
src
  components
  assets
  Quiztype
  Contact.js
  Hero.js
  Home.js
  Navigation.js
  Fonts
  App.css
  App.js
  App.test.js
  index.css
  index.js
  logo.svg
  serviceWorker.js
.gitignore
package.json
package-lock.json
README.md
External Libraries
Scratches and Consoles
Navigation.js
1 import React, {Component} from 'react';
2 import Navbar from "react-bootstrap/Navbar";
3 import './assets/css/bootstrap.min.css';
4 import logo from './assets/images/loggame.png';
5 import './Quiztype/Scineces.css';
6
7 class Navigation extends Component {
8   render() {
9     return (
10      <div>
11        <Navbar className="logo">
12          <Navbar.Brand href="#home">
13            <img
14              src={logo}
15              className="d-inline-block align-top"
16              alt="Game for Learn"
17            />
18          </Navbar.Brand>
19        </Navbar>
20      </div>
21    );
22  }
23 }
24
25 export default Navigation;
```

```
File Edit View Navigate Code Refactor Run Tools VCS Window Help glearn [C:\Users\sazid\WebstormProjects\glearn] - ...src\App.js - WebStorm
glearn src App.js npm start
Project glearn C:\Users\sazid\WebstormProjects\glearn
node_modules library root
public
  favicon.ico
  favicon.png
  index.html
  logo192.png
  logo512.png
  manifest.json
  robots.txt
src
  components
  Fonts
  App.css
  App.js
  App.test.js
  index.css
  index.js
  logo.svg
  serviceWorker.js
.gitignore
package.json
package-lock.json
README.md
External Libraries
Scratches and Consoles
App.js
1 import React from 'react';
2 import './App.css';
3 import Navigation from './components/Navigation';
4 import Hero from './components/Hero';
5 import Home from './components/Home';
6 import Contact from './components/Contact';
7
8 function App() {
9   return (
10    <div className="App">
11      <Navigation/>
12      <Hero/>
13      <Home/>
14      <Contact/>
15      <p className="App-header"> @ gameforlearn.com</p>
16    </div>
17  );
18 }
19
20 export default App;
```

```

File Edit View Navigate Code Refactor Run Tools VCS Window Help glearn [C:\Users\sazid\WebstormProjects\glearn] - ...src\index.js - WebStorm
glearn | src | index.js | npm start
Project | glearn | node_modules | library root | public | favicon.ico | favicon.png | index.html | logo192.png | logo512.png | manifest.json | robots.txt | src | components | Fonts | App.css | App.js | App.test.js | index.css | index.js | logo.svg | serviceWorker.js | .gitignore | package.json | package-lock.json | README.md | External Libraries | Scratches and Consoles
index.html | index.js
1 import React from 'react';
2 import ReactDOM from 'react-dom';
3 import './index.css';
4 import App from './App';
5 import * as serviceWorker from './serviceWorker';
6 import './Fonts/OpenSans-Regular.ttf';
7
8 ReactDOM.render(<App />, document.getElementById( elementId: 'root'));
9
10 // If you want your app to work offline and load faster, you can change
11 // unregister() to register() below. Note this comes with some pitfalls.
12 // Learn more about service workers: https://bit.ly/CRA-PWA
13 serviceWorker.unregister();
14

```

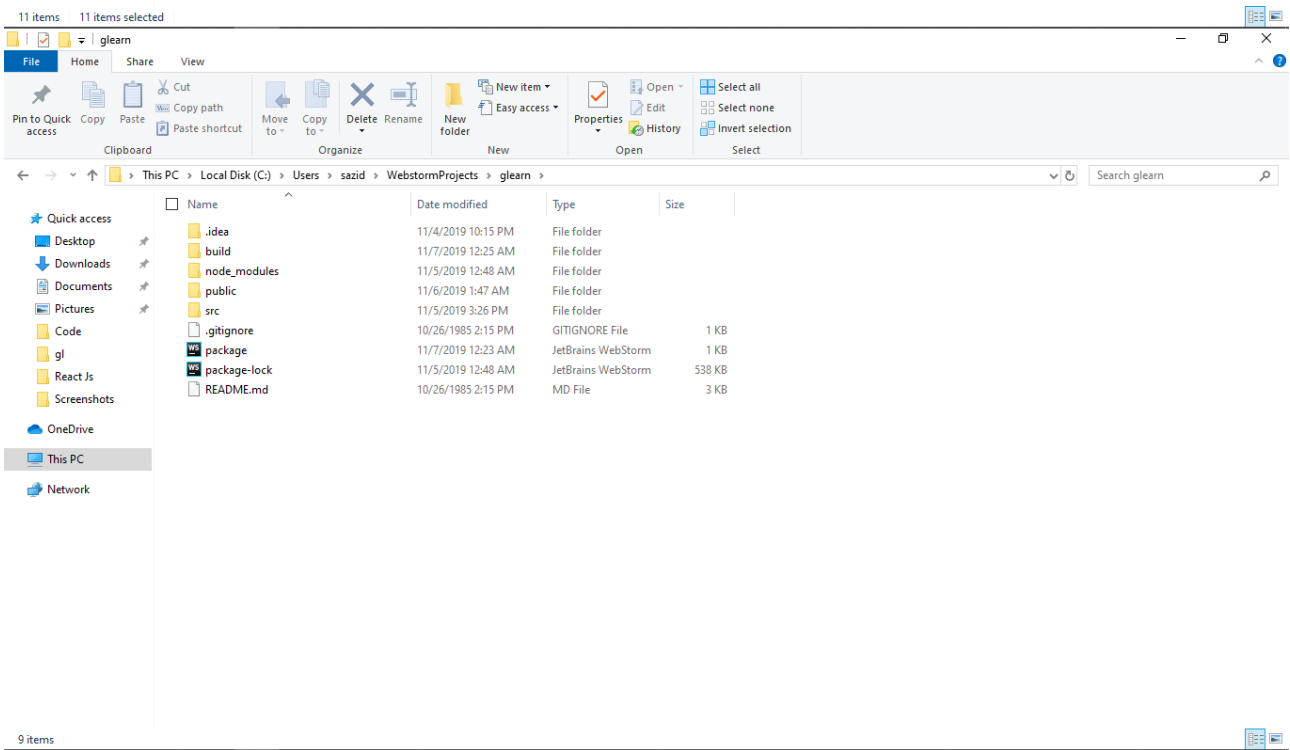
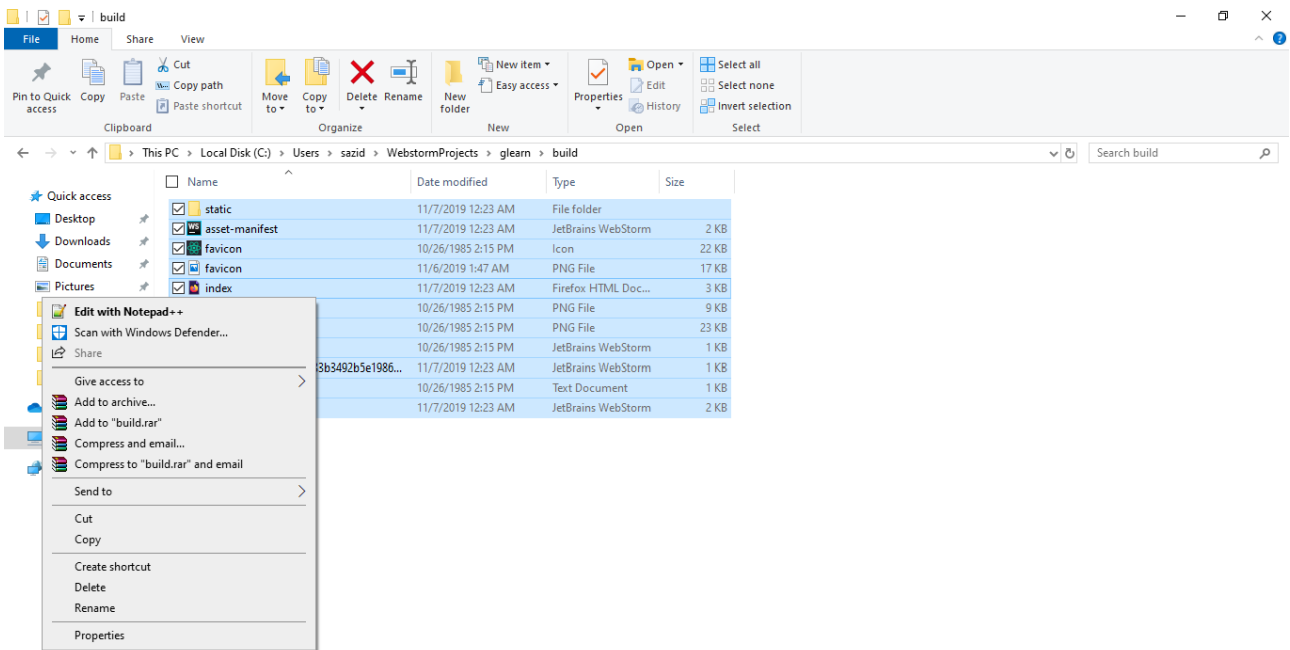
```

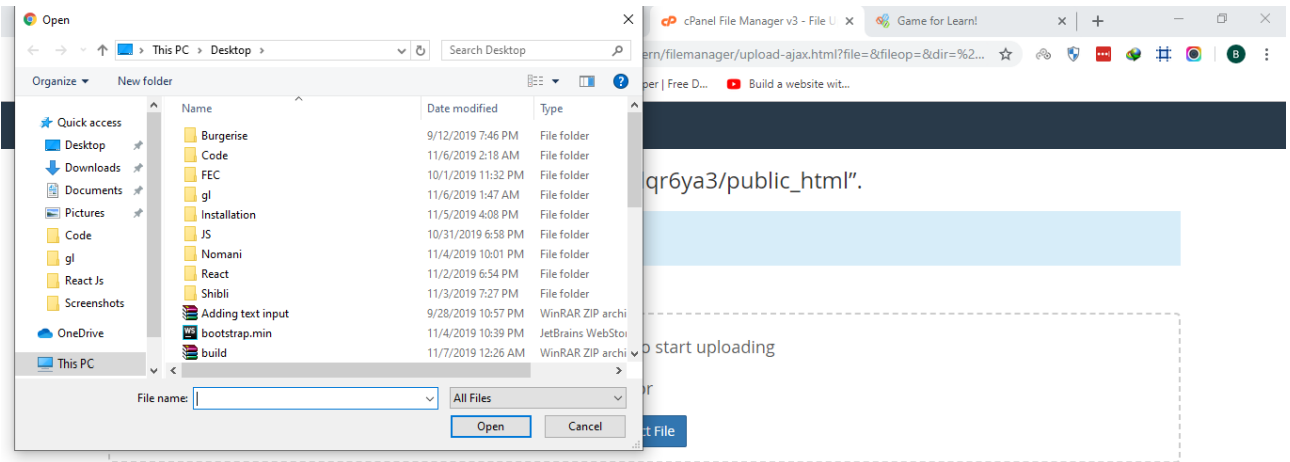
File Edit View Navigate Code Refactor Run Tools VCS Window Help glearn [C:\Users\sazid\WebstormProjects\glearn] - ...public\index.html - WebStorm
glearn | public | index.html | npm start
Project | glearn | node_modules | library root | public | favicon.ico | favicon.png | index.html | logo192.png | logo512.png | manifest.json | robots.txt | src | components | Fonts | App.css | App.js | App.test.js | index.css | index.js | logo.svg | serviceWorker.js | .gitignore | package.json | package-lock.json | README.md | External Libraries | Scratches and Consoles
index.html
7 <meta name="theme-color" content="#000000" />
8 <meta
9   name="description"
10  content="Web site created using create-react-app"
11 />
12 <link rel="apple-touch-icon" href="logo192.png" />
13 <!--
14  manifest.json provides metadata used when your web app is installed on a
15  user's mobile device or desktop. See https://developers.google.com/web/fundamentals/web-app-manifest/
16 -->
17 <link rel="manifest" href="%PUBLIC_URL%/manifest.json" />
18 <!--
19  Notice the use of %PUBLIC_URL% in the tags above.
20  It will be replaced with the URL of the `public` folder during the build.
21  Only files inside the `public` folder can be referenced from the HTML.
22
23  Unlike "/favicon.ico" or "favicon.ico", "%PUBLIC_URL%/favicon.ico" will
24  work correctly both with client-side routing and a non-root public URL.
25  Learn how to configure a non-root public URL by running `npm run build`.
26 -->
27 <title>Game for Learn!</title>
28 </head>
29 <body>
30 <noscript>You need to enable JavaScript to run this app.</noscript>
31 <div id="root"></div>
32 <!--
33  This HTML file is a template.
34  If you open it directly in the browser, you will see an empty page.
35
36  You can add webfonts, meta tags, or analytics to this file.
37  The build step will place the bundled scripts into the <body> tag.

```

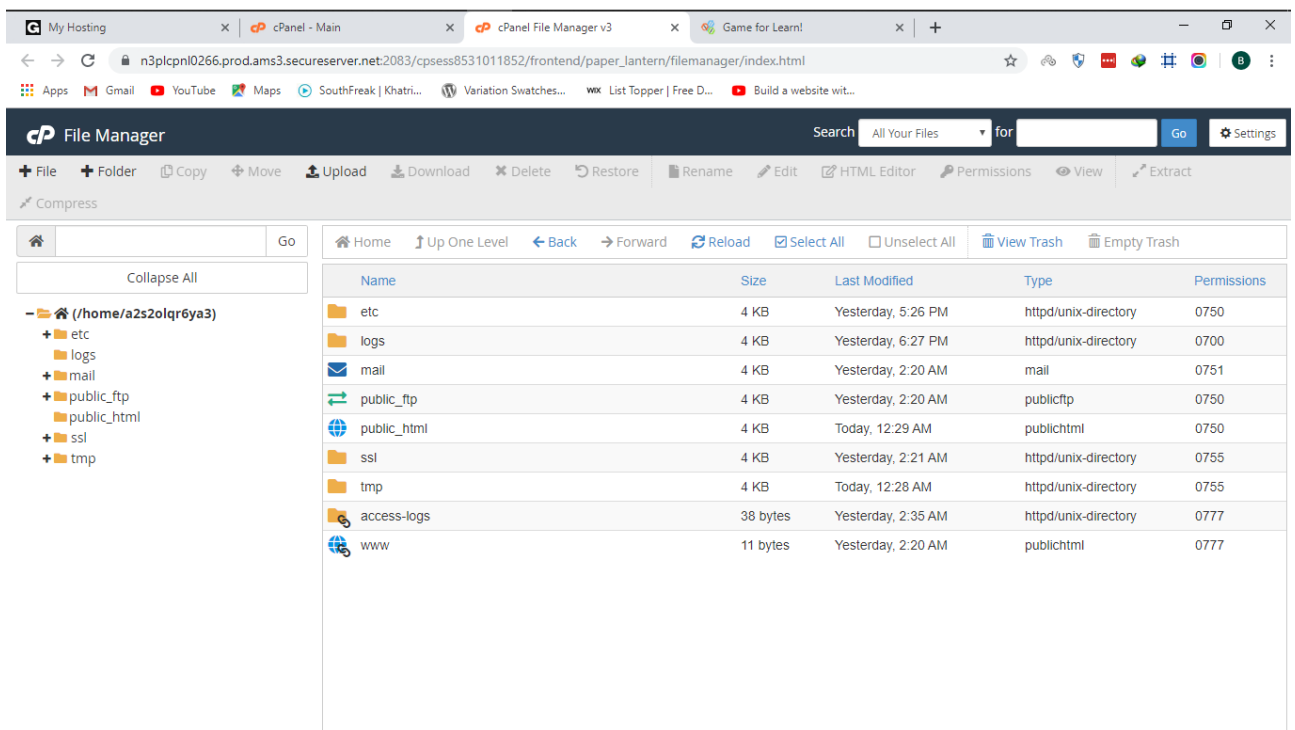
UPLOADING TO LIVE SERVER

APPENDIX II





Go Back to "/home/a2s2olqr6ya3/public_html"



My Hosting x cPanel - Main x cPanel File Manager v3 x Game for Learn! x +

n3plcpnl0266.prod.ams3.secureserver.net:2083/cpsess8531011852/frontend/paper_lantern/index.html?login=1&post_login=36229310015590

Apps Gmail YouTube Maps SouthFreak | Khatri... Variation Swatches... List Topper | Free D... Build a website wit...

cPanel Search (/) a2s2olqr6ya3 LOGOUT

Find functions quickly by typing here.

FILES

- File Manager
- Images
- Directory Privacy
- Disk Usage
- Web Disk
- FTP Accounts
- FTP Connections
- Backup
- Backup Wizard
- Git™ Version Control
- File and Directory Restoration

DATABASES

- phpMyAdmin
- MySQL® Databases
- MySQL® Database Wizard
- Remote MySQL®

DOMAINS

GENERAL INFORMATION

- Current User: a2s2olqr6ya3
- Primary Domain: gameforlearn.com
- Shared IP Address: 160.153.133.181
- Home Directory: /home/a2s2olqr6ya3
- Last Login IP Address: 85.76.106.35
- Theme: paper_lantern
- Server Information

STATISTICS

- Addon Domains: 0 / 0
- File Usage

n3plcpnl0266.prod.ams3.secureserver.net:2083/cpsess8531011852/.../index.html