ABSTRACT

Bedroom is important to everyone where people usually sleep for the night or relax during the day. About one third of our lives are spent sleeping and most of the time we are sleep, we are sleeping in a bedroom. So, environment in the bedroom will affect people become more relax. This system uses the 3D model to make so that it becomes more interesting to use it. The objectives to develop the applications are: (1) To develop a prototype of bedroom decoration that allows user to decorate their room.(2) To apply 3D modelling technique to the system This system also have made the users task become easier and faster than before. They can view the 3D model in this system. Besides that, this system also provides a great 3D perspective of the bedroom decoration. It makes it possible to create 3D graphic.
ABSTRAK

Bilik tidur sangat penting kepada semua orang dimana mereka biasanya tidur pada waktu malam dan berehat pada waktu siang. Lebih kuarang satu per tiga kehidupan seharian kita luangkan masa untuk tidur. Sistem ini menggunakan 3D model dan ini membuatkan ianya lebih menarik untuk digunakan. Objektif untuk membuat sistem ini adalah: (1) Untuk membagunkan satu prototaip untuk pengguna menghias bilik tidur. (2) Untuk menggunakan teknik pemodelan 3D. Mereka boleh melihat model 3D didalam ssistem ini dengan lancar. Selain it, aplikasi ini juga memberikan perspektif yang hebat 3D hiasa bilik tidur. Ini tidak mustahil untuk menbuat grafik 3D yang boleh di kemas kini dalam masa yang cepat dalam browser.
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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

3D (three dimensional) space is a geometric three parameters model of the physical universe (without considering time) in which we live. These three dimensions are commonly called length, width, and depth (or height), although any three directions can be chosen, provided that they do not lie in the same plane [1]. 3D is better than 2D because 2D only have two dimension and if we turn to the side it become a line. Different from 3D because 3D has the third axis that is z axis so, it allows for rotation. Therefore, when we use the 3D to build the virtual home it looks more lifelike model.

3D bedroom decoration is the system that can be use to decorate the bedroom follow the user wants. It’s also allows the user imagination to run and very useful interior design, it is also a lot of fun, allowing user to mix and match furniture with ease. This system we use the 3D model and will be rendering in this website so for the current application cannot visualize all part of the room it just can view the main part.

Some additional for this application is it use in the Unity. Unity is a game development tool that has been designed to let we focus on creating amazing games. This software also uses Java Programming language that has a capability to allow it to generate 3D graphics within any compatible web browser. This will make the application become more interesting because this system just like a game where user just plays change the colour, furniture in the room.
This project is proposed to improve the current implementation of 3D Bedroom Decoration that we design it to make the user feel fun when they use it. User just clicks the button that will provide in the system and automatically change the colour, furniture follows the user want. Once the user selected the colour, the next step is the layout of the room, i.e. the dimensions of the bedroom. This step helps them figure out which one the furniture should be placed. Finally the system will display and user can view all part of the bedroom to make sure the changes that they made is satisfied if not satisfied they will make it again follow the steps that they do before this.

1.2 PROBLEM STATEMENT

There are few problems that need to be concern. One of the problems is when user wants to decorate their room their imagination limited to imagine what they should do to make sure their room look beautiful.

Besides that, user needs to hire the architecture to decorate their room but sometime user feel not satisfied with the result. So they will complain or just ignore it although they not like it.

1.3 OBJECTIVES

The objectives of this project are:

i. To develop a prototype of bedroom decoration that allows user to decorate their room.

ii. To apply 3D modelling technique to the system.

1.4 SCOPE

The scopes of the project that have been identified are:

i. This system had been developed for the user who needs to decorate their bedroom.

ii. This system had been run on web site so that user easy to use it.

iii. This system had been developed using 3D modelling technique comprises of texture and shading.
1.5 THESIS ORGANIZATION

This thesis consists of six chapters. Chapter one is explanation of introduction to system and research. This chapter will discuss about introduction, objectives, problem statements, and scope of the project.

Chapter two will discuss about the research for project that has been chosen. The researches divide into two that are for current system or case study and research for technique that will be used to develop current system.

For Chapter three will be discuss on approach and overall work load to develop this system. The content consists of the approach and framework for the project that used in this system.

Implementation of process that is involved during development of this system is explained in detail in Chapter four.

The result that obtained from the implementation of the system is discussed thoroughly in Chapter five. The constraints of this project are also stated clearly in Chapter five.

Last chapter in this thesis is a conclusion which describe summary on the overall system.
CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter briefly describes the review on existing techniques related with 3D bedroom decoration that will be developed later. This chapter comprises two sections: The first section describes the comprehensive review on existing related systems. The second section describes the review on method, equipment, and technology previously used in the same domain.

2.2 EXISTING SYSTEM

There is some system which shares similarity with this application. Below the example of the online system that is exist at the internet Armstrong Design a Room and KB Home.

2.2.1 Armstrong Design a Room

Armstrong World Industries, Inc. is a global leader in the design and manufacture of floors, ceilings and cabinets. This system also can decorate the bedroom. What make this application is more interesting are they have many types of floors. Besides that, the heart of the Armstrong brand is our commitment to helping their customers get the right flooring for their home. Armstrong design has been pursuing this with beautiful, durable and innovative flooring for every room of the home on hardwood, vinyl sheet, luxury vinyl plank and tile. The Armstrong brand is trusted quality.
Armstrong markets the most extensive portfolio of residential and commercial floor products available - hardwood, laminate, linoleum, vinyl sheet and tile, ceramic and BioBased Tile® – under the brand names Armstrong®, Bruce® and Robbins®. The company’s global acoustical ceiling and suspension systems business is 90 percent commercial – offices, healthcare, education, retail, transportation and other segments – and 10 percent residential. Armstrong makes cabinetry for single-family and multi-family builders and remodelers in the U.S. [3]

![Image of Design A Room interface](image)

Figure 2.1 Example interface for the decoration for bedroom
Figure 2.1 shows the application for user to make some decision to choose room type for the bedroom and also can choose room style like classic, casual or traditional. Types of wood and colour also will be select follow the user wants.

2.2.2 KB Home

KB Home makes it easy to design your own home. The interactive personalization tool allows user to select KB Home Studio options and preview the choices directly on your computer screen. As you make selections from the options menu the picture changes to reflect your choices.

Here we can choose type of the room that we want to decorate. So, for example we choose a kitchen. In the kitchen user can choose among the various countertop choices, customize the look of cabinets and choose between Whirlpool or Kitchen aid appliances. Decide if user wants a stand-up or tub shower in the bath. In the family room, differentiate between various window treatments and light fixtures and whether or not to include a fireplace. [4]

Figure 2.2 Model of house
2.2.3 Comparisons between Armstrong Design a Room, and KB Home

The entire website shown at the above has similarities in many ways. All the application has the same function that is to decorate the room. It can see that they also use the same way to show the properties to make user easily to know how to decorate or use the system. So, user can create or build by themselves to decorate their bedroom. They can try and see how it look if satisfied with their decoration they can use it for their own bedroom.

But all the system also have a different way to determine the concept that every application has apply like way to make the system more interactive, more interesting and others. Every application there is a weakness for example Armstrong Design and KB Home. This application use 2D model and make this system not really interesting but still interactive because can change the floor, wall and others.

Besides that, KB Home make the properties is more detail than Armstrong Design a Room. So user can have more option to choose the decoration in their room. The interactive personalization tool allows user to select KB Home Studio options and preview the choices directly on user computer screen. As user make selections from the options menu the picture changes to reflect your choices. In the kitchen at figure 2.2 users can choose among the various countertop choices, customize the look of cabinets and choose between Whirlpool or Kitchen aid appliances. While the Armstrong Design a Room actually not really different between the KB Home Studio and the properties that have in the application is much. User just can change the floor and colour of wall only. So, user doesn’t have many options to choose to decorate their bedroom.

2.3 Studies on Technique

Computer graphics are graphics created using computers and more generally, the representation and manipulation of image data by a computer with help from specialized software and hardware. The development of computer graphics has made computers easier to interact with, and better for understanding and interpreting many types of data. Developments in computer graphics have had a profound impact on many
types of media and have revolution animation, movie and the video game industry. There are many kind of technique in computer graphic such as:

i. Implementation
   a) Rendering

ii. Development
   a) 3D Model
      1. 3D Modelling
      2. Lighting
      3. Texture mapping

2.3.1 Implementation - Rendering

Rendering is the process of generating an image from a model and it called scene. A scene file contains objects in a strictly defined language or data structure; it would contain geometry, viewpoint, texture, lighting, and shading information as a description of the virtual scene. [5] The data contained in the scene file is then passed to a rendering program to be processed and output to a digital image or raster graphics image file. Rendering converts a model into image either by simulating light transport to get photorealistic images, or by applying some kind of style as in non photorealistic rendering. The two basic operations in realistic rendering are transport that is how much light gets from one place to another and scattering is how the surface interacts with light. This step is usually performed using 3D computer graphics software or a 3D API. The process of altering the scene into a suitable form for rendering also involves 3D projection which allows a three-dimensional image to be viewed in two dimensions.

2.3.2 Development – 3D Model

2.3.2.1 3D Modelling

3D modelling can view two dimensional images through 3D rendering process. So it can make us easy to see the model through the perspective view for example view from the top, right, left, and bottom. Besides that, when we use
3D modelling to create the model it looks like a real scene and make it more interesting. Bellow is the example of 3D model. [6]

![3D Model](image)

**Figure 2.3 3D Model**

### 2.3.2.2 Lighting

Lighting is important part to make the 3D bedroom Decoration look more real because it gives a practical or aesthetic effect. Lightning is includes both artificial light sources such as lamps and natural illumination by capturing daylight using window, skylight, and others. [7]

![Example light source](image)

**Figure 2.4 example light source**
2.3.2.3 Texture Mapping

Texture mapping is a method for adding detail surface (a bit map or raster image), or colour to a computer generated graphic was pioneered by Dr Edwin Catmull in his Ph.D. thesis of 1994. [8]

A texture map is applied (mapped) to the surface of a shape or polygon. This process is skin to applying patterned paper to a plain white box. Texture mapping is a method to make the surface look more interesting and colourful with the texture. This process to apply a pattern of the 3D texture based on a three dimensional position and also can model in any object.

2.4 Development Tools

Software Approach is a description about the software that used during the development process 3D Bedroom Decoration. The software needed to develop application is Blender or Autodesk Maya for create the 3D model and Dreamweaver to create the interface. The system built using the Java scripting Language. There the brief explanations about the software that used in this system:

I) Blender and Autodesk Maya

Blender and Autodesk Maya have the same function that can build the 3D object. In my opinion Autodesk Maya is easier than Blender. Blender is computer graphic software that to creating the model for example makes the 3D objects like furniture, wall and others decoration that will be use in the project. This software can make the interactive 3D application and make the user can view in other perspective view. In this software also we can make the texturing, give a shape, editing, colouring and others.

Autodesk® Maya® 3D animation software delivers a comprehensive creative feature set with tools for animation, modelling, simulation, rendering, match moving, and compositing on a highly extensible production platform. For
visual effects, game development, post production, or other 3D animation projects, Maya offers toolsets to help meet demanding production requirements. Maya 2013 adds tools that help facilitate parallel workflows and complexity handling; powerful new creative toolsets; and productivity enhancements to help you create higher quality content quickly. [9]

II) Unity

Unity is an integrated authoring tool for creating 3D video games or other interactive content such as architectural visualizations or real-time 3D animations. Use unity to make it function so that the model and the other object in the interface will connect with each other. It just like a game because unity is a software to make a game and this application we just use the button for the user to click and change the properties in the system. So is easy for the first user to use it.

It can also produce browser games that use the Unity web player plug-in, supported on Mac and Windows but not Linux. The web player is also used for deployment as Mac widgets. Unity also has the ability to export games to Adobe's Stage 3D functionality in Flash, but certain features that the web player supports are not usable due to limitations in Flash. [10]

III) JavaScript

JavaScript is a client side or prototype-based scripting language. It is designed to add interactivity system to the user. Although Unity's JavaScript tries to follow the ECMAScript standard closely, it varies in many ways from other implementations of JavaScript that are based on the same standard. It is perhaps most similar to Microsoft's JScript especially in that both are .NET languages. However, Unity's version was developed independently and there are a number of differences between the two. submitted to a server. Detect the visitor’s browser by load another page specifically designed for that browser.
2.5 CONCLUSION

This Chapter explained the literature review on similarity system since it would be the guidance in this system. In order to develop this system, macromedia Blender or Autodesk Maya will be used as to create the model. For the interface, Unit has been chosen to build the interface platform since it is suitable for my system. The Java programming language that is being used to make the items in the model link into the button.
CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

This chapter explains the methodology that is the software process to manage better the system development. The methodology that applied in this development process is Software Development Life Cycle (SDLC) method. From the beginning, this project will be developed based on the methodology choose.

3.2 SOFTWARE DEVELOPMENT CYCLE (SDLC) METHOD

Software Development Life Cycle (SDLC) is a methodology that is typically used to develop, maintain and replace information systems for improving the quality of the software design and development process. The typical phases are analysis, estimation, design, development, integration and testing and implementation. The success of software largely depends on proper analysis, estimation, design and testing before the same is implemented. [12]

Life cycle of software development is a gradual process followed in software development. It is also called the software life cycle. The sooner of the process is primarily on the developer. Today, SDLC involves teams of experts in various fields such as analysts, testers, architects, programmers, and even end users. Cycle of software development is important because it provides a plan to bring together various aspects of software development. Without these two dies or is exercising it against the standards set or expected.
SDLC also allowed variation among its phases. Additional information is made available to the development team that requires changes in the outputs of previous stages. In this case, the development effort is usually suspended until the changes can be reconciled with the current design, and the new results are passed down the waterfall until the project reaches the point where it was suspended.

In this project, there are five phases in the Software Development Life Cycle (SDLC) that will use for solving the problem that contain. Figure 3.1 shows the flow of the SDLC methodology. The phases involved in this methodology are:

i. Identification Phase
ii. Planning Phase
iii. Analysis Phase
iv. Design Phase
v. Implementation Phase

Figure 3.1: Flow of Software Development Life Cycle (SDLC)
3.2.1 Identification phase

In order of the project identification phase, a few activities involve such as to identify what the system will develop and recognize the problem that face by current application based on case study taken from current process. Besides that, this phase also to identify the technique that approach. It is also to identify the problem that release in the current process according to the case study.

To identify the real problem that needs to be concern that is when user wants to decorate their room their imagination limited to imagine what they should do to make sure their room look beautiful. Besides that, user needs to hire the architecture to decorate their room but sometime user feel not satisfied with the result. So they will complain or just ignore it although they not like it.

3.2.2 Planning Phase

The objective of this phase is to understand the requirement specification in this application. The activities involve such as do a research about a careful of any current application, manual and computerized and also make some research to get specification about the application. The data information was collected based on what related to the application such as learning strategy and best way to develop the application according to the requirement that need in this application. This phase is to determine the application goals that approach for this application and to determine the systematic management to arrange the decoration in the bedroom. Base on case study, all resources and data are getting from internet searching.

3.2.3 Analysis Phase

In this software requirements analysis, firstly analysis requirement is for the proposed system. To understand the nature of the program to built, the system engineer must understand the information domain for the software, as well as required functions, performance and the interfacing. From the available information the system engineer