



COMPUTER GRAPHICS

Abduraimova Muazzamoy Abduqodir qizi

Kokand State Pedagogical Institute

" Engineering graphics and design theory " bias Phase 1 Graduate

E-mail: muazzamoyabduraimova@gmail.com

Abstract: The article mainly focuses on computer graphics, graphic programs and general information about them, their capabilities. Information about the development history of computer graphics and 3D computer graphics, Maya, Paint 3D, SketchUP, Substance 3D Painter is given.

Key words: Computer graphics, programs, hardware, external storage device, processor, display, monitor, input devices, keyboard - keypad, mouse, scanner, paper output device, printer, plotter, speakers, operating system, 3D, 3D computer graphics, about Maya, Paint 3D, SketchUP, Substance 3D Painter.

INTRODUCTION:

Computer graphics is, first of all, a widespread software application, that is, computer graphics relies on existing and newly created software. It is even widely used to decorate the programs themselves. Its development made it possible to accurately describe (even in motion) how the processes take place in a real three-dimensional space. By now, the graphical user interface for working with a personal computer program has become the standard. It has a lot to do with the human psyche: clarity allows for faster understanding. Nowadays, the terms computer graphics (CG) and computer animation (CA) are used. In the processing of information related to the image (picture) on the computer monitor, three main directions are distinguished: image selection (detection), image processing and computer (machine) graphics.

LITERATURE ANALYSIS AND METHODOLOGY:

Computer graphics is taught using the following technical and software tools:

Technical tools:

- 1 - External memory device - processor;
- 2- Display - monitor;
- 3 - Input devices: Keyboard - keyboard, mouse, scanner, etc.;
- 4 - Printing device - printer, plotter, etc
- 5- Loudspeakers

Software tools:

Programs: divided into system-operational and practical programs. Operating programs serve as an intermediary in the user's communication with the computer. With their help, actions such as using fast memory, reading information from diskettes, writing information to diskette, and launching practical programs are performed.

Practical programs - this or that graphic is created for information and entered into the computer. Programs are written in BASIC or Pascal. In this tutorial, you will be taught how to perform graphic information on a computer using AutoCAD programs, an automated computer graphics design system. In this case, AutoCAD-2006 programs are used from the latest versions of AutoCAD developed for use.

RESULTS:

Imaging methods: 3D computer graphics are graphic works of art created using digital computers and

3D software. The term can also refer to the process of creating such graphics or the field of study of 3D computer graphics techniques and related technologies.

3D computer graphics differs from 2D computer graphics in that a three-dimensional representation of geometric data is stored in a computer to perform calculations and display 2D images. Such images may be for later display or real-time viewing.

3D modeling is the process of preparing geometric data for 3D computer graphics and is similar to sculpture or photography, while 2D graphic art is similar to painting. Despite these differences, 3D computer graphics rely on the same algorithms as 2D computer graphics.

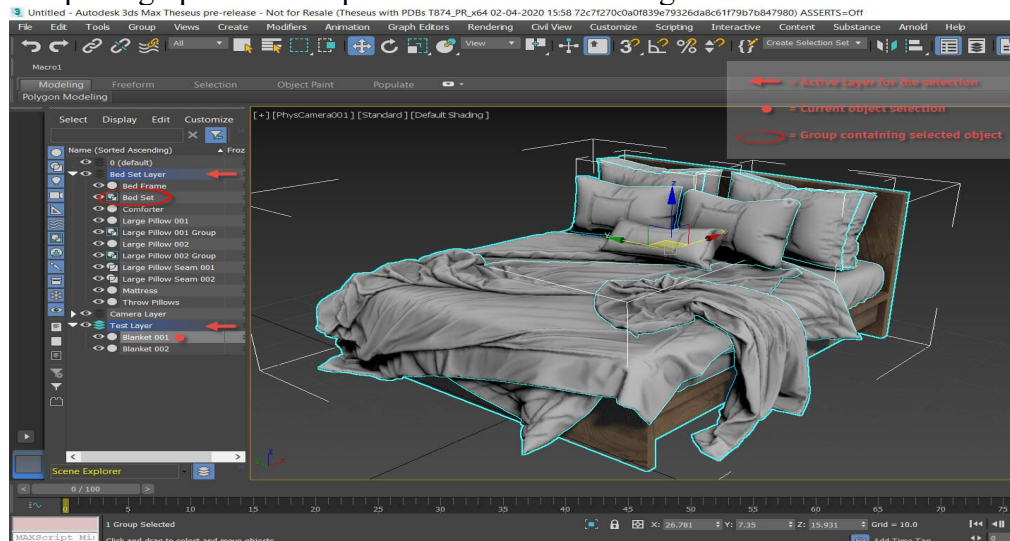
In computer graphics software, the distinction between 2D and 3D is occasionally blurred; 2D applications can use 3D techniques to achieve effects such as lighting, and primarily 3D can use 2D techniques.

History of development of computer graphics.

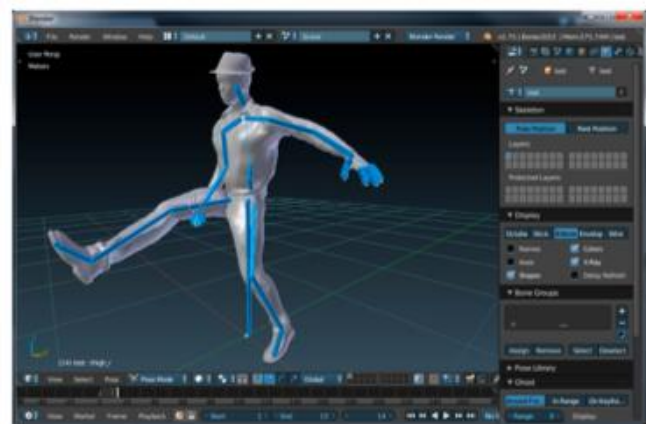
General information about graphics programs and their capabilities A brief history of AutoCad. Today, there are many computer graphics programs, which differ from each other according to the field of application. Professionals in each field choose a graphic program that is convenient for their activities. The scope of the programs will also be focused on a specific area. So, when choosing a graphic program, it is necessary to take into account its capabilities. In most cases, it is necessary to master other programs or disciplines before using a graphics program. And with that, graphics programs become more complex.

DISCUSSION:

3D Computer Graphics: 3D computer graphics are graphic artworks created using digital computers and 3D software. The term can also refer to the process of creating such graphics or the field of study of 3D computer graphics techniques and related technologies.



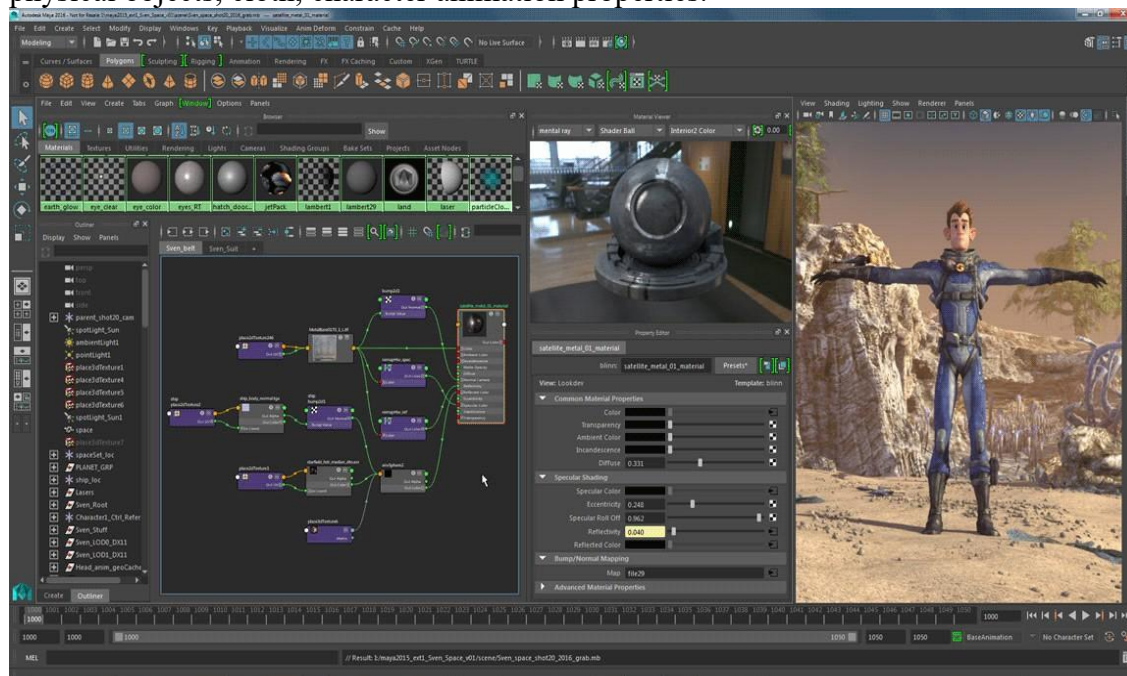
3Ds Max is a program for professionals.



Blender-Free software for 3D visualization. Its advantage is functionality. The software allows you to model, texturize, draw, animate. An integrated video editor and your own game engine allow you to create models from scratch: from sculpting to animation. The developer regularly improves and improves the software, but this has a drawback - users have to constantly get used to changes in the interface. Blender is compatible with all platforms: Windows, macOS, Linux.

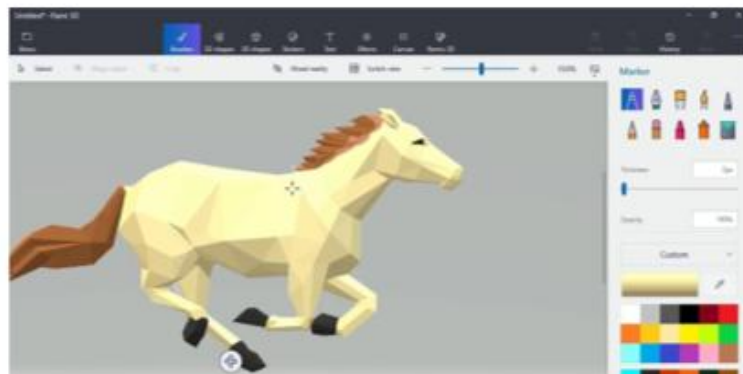
Maya - Powerful paid 3D modeling software with a comprehensive set of tools. Included in the top of the best programs for graphic visualization. It is not suitable for some users, it takes a lot of time and

diligence to master. Maya is great for lighting, rendering, modeling and texturing. It works with fluids, physical objects, cloth, character animation properties.



Maya

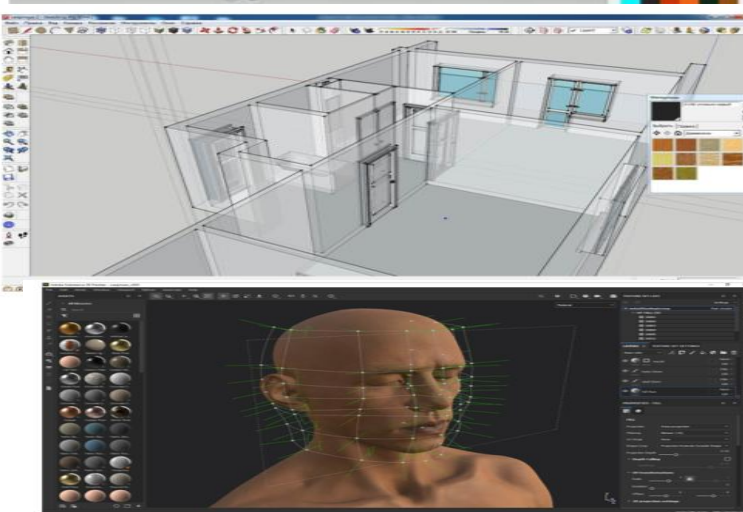
Maya Autodesk- is another professional 3D graphics editor that focuses on animation and special effects, unlike 3ds Max. It is often used when working on movies and animations. The program has many special functions, for example, the dynamics of hard and soft bodies during visualization. In addition, with the help of brushes on "digital clay" it is possible to sculpt organic characters, as in Zbrush Maya is hardly used in interiors or architecture: it cannot replace 3ds Max. The main speaker of this editor is the most convenient system for animating characters, so many Russian and Western studios animate characters in Maya.



Paint 3D - Free graphics editor for beginners, included in the Windows 10 operating system since 2017. Includes a set of tools for creating simple forms, records, and improving ready-made objects. The advantages of Paint 3D include ease of development, Russian interface, saving work in different files, disadvantages - limited functionality.

SketchUP-Founded in 2000 by American programmers. It is available in two versions paid and free. SketchUP is easy to learn, suitable for beginners. Disadvantages include limited possibilities for modeling complex surfaces.

Substance 3D Painter- Software for texturing models and working with materials. Purpose: film and game industry, architecture, furniture, clothing, interior design. The program is popular among professionals and beginners.



CONCLUSION:

ArchiCAD- A powerful software product popular in the field of CAD. Includes tools for drawing and designing structures in 3D space. A distinctive feature of the utility is the ability to create glass structures and curved elements. Features:

1. menu in Russian;
 2. a large library of objects,
 3. reference and spatial polygon mapping;
 4. setting surface surfaces, standard height, circle center and other parameters;
 5. Compatibility of the latest versions with Windows 8, 10 and Mac OS X (64 bit) operating systems.
- ArchiCAD is a paid program, but users can try it for free in demo mode for 1 month. The disadvantages include the "weight" of the software, which takes up at least 5 GB of disk space.



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