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# All the graphic information around us

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**Annotation.** Computer graphics are the main technology in digital photography, cinema, video games, digital art, mobile phone and computer displays, as well as in many specialized applications. A variety of specialized hardware and software has been developed, with most devices equipped with graphics hardware.

**Keywords:** computer graphics, technology, digital photography, cinema, video games, digital art, computer, specialized, equipment.

Computer graphics (eng. computer graphics, or CG) is a method of creating graphic images and visual information using special programs. The concept of computer graphics exists at the intersection of design and art, combining classical drawing and modern technology. Computer graphics are the result of human—machine interaction.

It will take 3-4 hours to create manual graphics, for example, a complex gradient using a drawing pad and an airbrush, and in Illustrator or Photoshop it will take several seconds. In this case, the result will be approximately the same. Hand—made graphics are considered more to be fine art, and computer graphics are considered to be design. The difference between the two types of graphics is in the degree of human presence and in the balance of art and technology.

All the graphic information around us is made using a computer: books, magazines, packages, wallpapers, posters, instructions, websites and applications, etc. Often manual graphics are harmoniously integrated into computer graphics: an illustrator draws an image with ink, watercolor or any other tool, and then digitizes it, embeds it into a layout and processes it. This integration transforms hand drawing into computer graphics.

You can learn how to package meanings into images and text in the Graphic Designer course. You can study in a convenient place and at any time, without long video lectures — all the information is collected in a convenient interactive task book. Each student creates a graduation project, which will become the basis of a portfolio and a plus for employment.

Raster computer graphics, or "raster" consists of many squares — pixels. Such an image cannot be enlarged without loss of quality: it begins to change, uneven edges and individual pixels appear. Raster graphics are created in the RGB color

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space and often have a beautiful gradient, complex transitions, interesting fill, lots of color and almost photographic realism.

Raster graphics are used when you need to draw, for example, a large and colorful illustration for a website: the moment of communication with the target audience plays an important role here. To create raster graphics, Adobe Photoshop is most often used — in this editor it is easiest to work with brushes, shades and color gradations.

Vector computer graphics consists of reference points and curves connecting them: such images can be scaled without loss of quality. Vector images are used to create infographics, icons and other interface elements, logos, corporate identity characters, landing pages, websites and applications. A vector is more informative than a raster.

Since the quality of vector images does not depend on resolution, they are used on large formats: billboards, buses, banners, banners, etc. You can create vector graphics in Adobe Illustrator, Figma and CorelDRAW.

Fractal graphics connect art and mathematics, it is the result of mathematical algorithms. The simplest example of fractal graphics is a kaleidoscope: a mechanism designs a certain pattern, building it without human intervention.

A fractal is an infinitely reproducible self—similar structure. Unlike a pattern, which is an infinitely repeatable pattern, it is impossible to completely predict the appearance of a fractal when it is created. An example of fractal graphics is a screensaver on a computer screen in sleep mode, where geometric objects similar to each other endlessly replace each other. Fractal graphics can be created in Adobe Illustrator, Figma and in fractal generators, for example, in Fractal Generator or Frax.

Fractal graphics often seem outdated because they are associated with the era of computer clubs in the early 90s: complex gradients on a dark background, flashy backlight - the peculiar beauty of fractals is perceived as a cliche. Nevertheless, fractals can still be found on the screensavers of websites and applications — rhythmic images in light colors are used instead of patterns.

3D graphics convey a sense of volume. When a designer draws a picture in 2D, he uses two axes: height and width. In three—dimensional graphics, a third axis is added to them - depth. Each point has its own coordinates on each of the three axes. Three-dimensional graphics are used in various industries: from architecture to the medical industry. In design, 3D graphics are actively used in the fields of game development, branding, identity, website design and mobile applications: for example, when creating illustrations, icons and logos.

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Blender is often used to create 3D graphics, as well as the 3dsMax program: in it you can split the screen into four fields, one for each axis, plus a perspective view. This allows you to change the direction of each point and see changes in all projections.

In addition to video games, in most of which CG is all that the player sees, computer graphics are used by specialists in many fields. Here are some of them:

• the film industry — where this technology is now used almost everywhere, and the amount of CG is determined only by the genre;

• Architecture — specialized visualization software exists (for example, AutoCAD has been automating design and drafting since the early 1980s);

• Science — scientists simulate various experiments in the 3D sphere, and this simplifies their work;

• medicine — there are also special simulators for doctors (for example, VR Surgery Simulator increases the effectiveness of surgical operations);

• Advertising — many marketing campaigns are fully or partially created using CG;

• education — there are simulators specially designed for training, as well as educational versions of entertainment games (for example, Minecraft: Education Edition);

• 3D printing - using a 3D printer, it is now possible to reproduce special three—dimensional models in the real world, creating real objects.

Which CG works have revolutionized

The first computers were used only for calculations, and the first graphics were patterns that formed incandescent lamps turning on and off. One of the first animations was a "Kitty" in raster graphics. Its author is the Soviet mathematician Nikolai Konstantinov. And only then did computer graphics begin to develop and become more complex.

One of the graphics problems that can be solved in the near future is the ominous valley effect. The term was coined by Japanese roboticist and engineer Masahiro Mori. It is a phenomenon denoting irrational fear and disgust that arise when someone sees a robot or an object very similar to a human.

"We are coming to a point where wow effects are not achieved at the expense of the picture. Rather, in the future, cool scenarios will be important so that you are absorbed in the story, and this, on the contrary, is lost. You just look at the graphics, and there's already too much of it, you want meanings.

The industry has grown a lot, but the semantic load has failed. The second Avatar is also good, but not as interesting as the first one. History repeats itself, and

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you don't have a wow effect. I recently reviewed Breaking Bad, and there are very few graphics, but it [the series] is interesting and cool to watch. In "Mandalorian" everything is three-dimensional and cool, but it's not interesting to watch because of the primitive plot.

Graphics are a tool that allows you to reveal a story, characters, and teach something. And when the effect is for the sake of effect, as in the last "Star Wars", when horses galloped on a spaceship, it looks very strange. Although the artists tried very hard and painted everything cool." (Kirill Reznichenko)

We see computer graphics every day. It has become an integral part of the modern world. Graphics entertain us, help professionals in many fields, provide new opportunities for creativity, and allow us to copy images of real-world objects.

CG is now a tool for digitizing something that exists and at the same time a way to bring something imaginary to life. Graphic technologies will evolve and offer us more and more new methods of working with information — and who knows to what extent this area may evolve. Time will show. And we just have to watch.

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