

special software on a user's computer. With its help, some mathematical tasks are solved, as a result, bitcoins are created. The ability to pay with bitcoins appears every day. Already today, with the help of cryptocurrency, you can pay for goods on eBay, Microsoft, KFC, Shopify, Subway, and many others. [2] You can buy clothes, furniture, appliances, in some countries you can even pay for university tuition. You can pay for training in Germany, USA, Cyprus, Switzerland. Lucerne University of Switzerland accepts cryptocurrency through BitcoinSuisse. Bitcoin is accepted as payment in many restaurants and hotels around the world. Some people get paid in cryptocurrency. Every day there are new companies that introduce the ability to pay using digital currency. Payment can be made using a transfer to the specified wallet or via a separate payment system. Payment can be made by transferring to a specified wallet or through a separate payment system. The payment option via QR code is also possible. Since the end of 2018, in the state of Ohio in the USA, it is possible to pay tax in digital currency. As in other post-Soviet countries, Bitcoin has not yet been widely used in Ukraine, but it is used very actively in the Internet sphere. Ukraine is among the top 10 countries in the number of bitcoin wallets due to IT specialists who actively invest in this currency.

The new payment system based on cryptography helps to achieve security, anonymity, and decentralization of virtual currency. The main advantages of this type of currency: the lack of an emission centres, control, and restriction of output, complete anonymity, the ability to generate currency, protection against inflation, etc. It is possible that in the future, cryptocurrencies will be able to replace such large payment operators as MasterCard and Visa. But even considering all the advantages of bitcoin, its prospects are ambiguous. Some countries introduce its circulation at the legal level, while others prohibit their use.

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#### VIDEO GAME DEVELOPMENT AS A BRANCH OF INFORMATION TECHNOLOGY

*Стаття присвячена відеоіграм як галузі інформаційних технологій. Проаналізовано процес розвитку, історія виникнення та розвиток, їх вплив на сучасний світ і місце в культурі.*

**Ключові слова:** відеогра, розробка, індустрія, розробник відеоігор.

*The article deals with video games as a branch of information technology. The process of development, the history of an origin and progress, their impact on the modern world and place in culture are analyzed.*

**Key words:** videogame, development, industry, videogame designer.

Game development is an art of creating games. It describes the design, development and release of a game. It may involve concept generation, design, development, test and release. While you create a game, it is important to think about the game mechanics, rewards, player engagement and level design [5].

In the modern world, the creation of video games is one of the largest segments of the entertainment industry. The following levels can be distinguished in the structure of the modern gaming industry: platforms, game engines, video games development, publication and operation, popularization and consumption.

Game platforms – hardware and software systems that allow you to run interactive gaming applications. Among the main types can be distinguished:

- Personal computers based on Windows, Mac / OS X or Linux
- Game consoles (specialized devices for games, now the 8th generation is in use - Xbox One, PlayStation 4, Nintendo Wii U)
- Mobile devices (iOS, Android, Windows)
- Universal web platforms, social networks (FB, VK, MM)
- Arcade machines
- Innovative virtual reality platforms

Game engines – a software layer between the platform and the actual game code. Using a ready-made game engine can significantly simplify the development of new games, reduce the cost of their production and significantly reduce the time to launch. Among the most advanced engines we can distinguish: Unity 3D, Unreal Development Kit, CryENGINE 3 Free SDK.

A large number of companies and independent teams are engaged in the creation of computer games. Experts from various professions participate in the development are programmers, game designers, artists, QA specialists, etc.

To create simple games, a specialist must know programming well, but if he wants to earn more, he will have to devote a lot of time to gaining new knowledge [2; p.64]. Developers can range in size from small groups making casual games to housing hundreds of employees and producing several large titles. Companies divide their subtasks of game's development. Individual job titles may vary; however, roles are the same within the industry. The development team consists of several members. Some members of the team may handle more than one role. Similarly more than one task may be handled by the same member. Team size can vary from 20 to 100 or more members, depending on the game's scope.

*A development team includes these roles or disciplines*

A game designer is a person who designs a gameplay, conceiving and designing the rules and structure of a game. Development teams usually have a lead designer who coordinates the work of other designers. They are the main visionary of the game. One of the roles of a designer is being a writer, often employed part-time to conceive game's narrative, dialogue, commentary, cutscene narrative, journals, video game packaging content, hint system, etc. In larger projects, there are often separate designers for various parts of the game, such as, game mechanics, user interface, characters, dialogue, graphics, etc.

A game artist is a visual artist who creates video game art. The art production is usually overseen by an art director or art lead, making sure their vision is followed. The art director manages the art team, scheduling and coordinating within the development team.

The artist's job may be 2D oriented or 3D oriented. 2D artists may produce concept art, sprites, textures, environmental backdrops or terrain images, and user interface. 3D artists may produce models or meshes, animation, 3D environment, and cinematics. Artists sometimes occupy both roles.

A game programmer is a software engineer who primarily develops video games or related software (such as game development tools). The game's codebase development is handled by programmers. There are usually one to several lead programmers, who implement the game's starting codebase and overview future development and programmer allocation on individual modules.

Individual programming disciplines roles include:

- Physics – the programming of the game engine, including simulating physics, collision, object movement, etc.;
- AI – producing computer agents using game AI techniques, such as scripting, planning, rule-based decisions, etc.

- Graphics – the managing of graphical content utilization and memory considerations; the production of graphics engine, integration of models, textures to work along the physics engine.
- Sound – integration of music, speech, effect sounds into the proper locations and times.
- Gameplay – implementation of various games rules and features (sometimes called a generalist);
  - Scripting – development and maintenance of high-level command system for various in-game tasks, such as AI, level editor triggers, etc.
  - UI – production of user interface elements, like option menus, HUDs, help and feedback systems, etc.
  - Input processing – processing and compatibility correlation of various input devices, such as keyboard, mouse, gamepad, etc.
  - Network communications – the managing of data inputs and outputs for local and internet gameplay.
  - Game tools – the production of tools to accompany the development of the game, especially for designers and scripters.

A level designer is a person who creates levels, challenges or missions for computer and/or video games using a specific set of programs. These programs may be commonly available commercial 3D or 2D design programs, or specially designed and tailored level editors made for a specific game.

Level designers work with both incomplete and complete versions of the game. Game programmers usually produce level editors and design tools for the designers to use. This eliminates the need for designers to access or modify game code. Level editors may involve custom high-level scripting languages for interactive environments or AIs. As opposed to the level editing tools sometimes available to the community, level designers often work with placeholders and prototypes aiming for consistency and clear layout before required artwork are completed.

Sound engineers are technical professionals responsible for sound effects and sound positioning. They sometimes oversee voice acting and other sound asset creation. Composers who create a game's musical score also comprise a game's sound team, though often this work is outsourced.

The quality assurance is carried out by game testers. A game tester analyzes video games to document software defects as part of a quality control. Testing is a highly technical field requiring computing expertise, and analytic competence.

The testers ensure that the game falls within the proposed design: it both works and is entertaining. This involves testing of all features, compatibility, localization, etc. Although, necessary throughout the whole development process, testing is expensive and is often actively utilized only towards the completion of the project [4].

Players are the main source of profit for gaming products. But in today's world, the most active players have become a significant driving force in popularizing games and partly in expanding content. Due to the wide spread of eSports, the most experienced players get the opportunity to transfer their hobbies with games to professional rails. A lot of championships are held in the world, and the stakes are so high that successful players can make a good eSportsman career on this. Now eSports is an entire industry with its infrastructure, funding and celebrities.

### *Computer game industry: origin history and development*

The first computer games appeared at the dawn of the computer era, at the time of tube computers. In 1952, A. S. Douglas, as part of his university dissertation, created the OXO program, which runs on a large EDSAC computer at the University of Cambridge. It was the simplest implementation of the game, known to all as "tic-tac-toe". But as long as technology did not allow the production of compact and reliable computer systems, the creation of games was the lot of individual enthusiastic researchers.

In the previous five years, the gaming industry around the world has experienced rapid growth. Growth was observed in all segments, but the main drivers during this period were mobile games on the two main platforms iOS and Android. It is worth noting that the United States and China make

the largest contribution to the volume of the game industry, but the market structure of these favorites varies greatly [1].

*Computer games in popular culture*

Computer games are present in various segments of popular culture, and games such as Mario, Park Man, The Legend of Zelda and Final Fantasy are commonly called pop culture phenomena, which have had a significant impact on it. A number of films were shot based on the games. There are “Lara Croft: Tomb Raider”, Mortal Kombat, “Resident Evil”, “Silent Hill”, etc. among them. In 1989, the film “Wizard” was released, in which the game Super Mario Bros. 3 showed before the release, caused an increase in interest in the United States. In 2018, the film “The First Player to Get Ready” was released, the plot of which is based on the role of video games in society, and also includes more than 100 Easter eggs, that is, references to games released over the past decades. The motive of video games is also present in the plots of such popular anime and manga as Dragon Drive and Sword Art Online [3].

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### ОРГАНІЗАЦІЯ ДИСТАНЦІЙНОГО НАВЧАННЯ В УМОВАХ НЕСПРИЯТЛИВОЇ ЕПІДЕМІОЛОГІЧНОЇ СИТУАЦІЇ І ПСИХОЛОГІЧНОГО ДИСКОНФОРТУ УЧАСНИКІВ НАВЧАЛЬНОГО ПРОЦЕСУ

*Вперше Україна зіткнулася з ситуацією тотального карантину. В швидкі терміни закладам освіти потрібно було організувати навчальне середовище, до якого мали б доступ всі учасники навчального процесу. Більшість ВУЗів вже практикували елементи дистанційного навчання, але для значної кількості закладів цей інструмент був на стадії розробки і впровадження. Перед викладачами постало питання: “Яку платформу вибрати?”, “Який засіб дозволить оптимально проводити навчальний процес?”.*

*Те, що всі учасники освітнього процесу знаходяться вдома, призводить до обмеження рухової активності і, відповідно, до зниження працездатності. Тривожний стан впливає на зниження концентрації уваги, важче запам’ятовується навчальний матеріал.*

**Ключові слова:** дистанційне навчання, технології дистанційного навчання, онлайн-інструменти, синхронне навчання, асинхронне навчання, інтернет-етикет.

Тим часом, поки МОН вирішувало, як створити єдиний навчальний простір, кожен викладач організував навчання, як міг. В умовах карантину викладачі повинні були працювати вдома, використовуючи технології навчання з урахуванням своїх технічних можливостей, а також можливостей своїх студентів. Кожен мав адаптуватися до таких умов навчання.