**About INF 231 FINAL PROJECT**

1. **Introduction**

The appearance of computer games can be attributed to the moment when computers from the experimental and almost secret sphere (after all, the trajectories of shells and missiles during military operations were to be calculated on them) began to move into the scientific and practical world. This happened in the late 60s of the XX century.

The computer began to have a more or less user-friendly interface - instead of light bulbs and mysterious indicators, alphanumeric displays appeared. Of course, there was no question of any schedule... But people work at computers, and nothing human is alien to them. And one fine evening, after a hard day's work, a young programmer (and who else could come up with the idea of using a computer for other purposes) decided to write a small program that would play with him in some not very difficult game, for example, "Bulls and Cows"... And of course, he wasn't the only one who came up with such an idea... Soon, entertainment programs began to appear more and more often and even began to be part of the software packages supplied with computers.

With the creation of computer graphics and the advent of real home computers, the gaming industry has grown rapidly. The games were released in thousands of copies, not counting pirated copies. In about ten years, more than b thousand titles of games have been released for the ZX-Spectrum home computer by Sinclair Research.

Now the gaming industry is one of the mainstays on which the personal computer industry stands, and what is a computer for at home, if not for games?

* 1. **Purpose**

Modern popular video games are an extremely detailed world. Every minute the player faces more and more new problems and tasks of a completely different scale. The child has to do several things at the same time: determine a priority task, constantly switch between it and less significant problems of a local nature, when new ones arise, quickly assess the degree of their importance and how long it will take to solve them and, of course, solve them. And all this, as a rule, must be done very, very quickly!

According to statistics, 80% of the gamer's playing time is defeated. Completing a task, moving to the next level, obtaining an artifact or defeating an opponent - all this is only 20% of the time. It would seem that if there are so few joyful moments, why do children continue to play video games? The answer is simple — they have a purpose. This is a goal imposed by the game, which cannot be abandoned, because the only possible form of refusal is to stop playing. This forces the players to be purposeful. Moreover, games teach children to look optimistically at the goal, believe in success and not give up. Gamers are always confident that victory is possible, and we need to get down to business as soon as possible.

The most popular games are online games. In them, the child does not play alone, but with many gamers, and naturally there is communication between them. The child is constantly learning to establish relationships, avoid conflicts and cope with them. Not so long ago, as a result of a large-scale study, it was found that children who spend about an hour a day playing video games are better adapted socially than those who do not play at all. These children themselves noted that they were happy with everything and thought that they could get along with their peers.

If you replay: According to the same study, those who played for more than three hours a day showed exactly the opposite results and had problems in live communication with peers.

It may seem to you that the game is a way to relax. The child comes after school and thus relaxes. Nothing like that, it just changes the type of load, because any game requires concentration and concentration from the gamer. It has been proven many times that people who play computer games remember information better and faster and concentrate better. A typical adult can concentrate on 3-4 objects at the same time, a gamer — on 6-7 objects. What does this give in practice? For example, there is a lower probability of mistakes due to inattention when solving school tasks.

* 1. **Intended Audience**

7-9 years old - children. At this age, children really like to play, and even at school all the material is served to them in the form of a game. They like to perform monotonous and simple actions that lead to some kind of result, or victory. Children are also interested in educational games. For the direct appeal of the game to the player, colorful and charismatic characters work well here, which are easy to draw for a child.

10-13 years old - early teens. It makes sense to distinguish this category from the category of teenagers, because it is transitional between childhood and adolescence, when the child is still a child, but begins to show interest in more adult things and topics in order to separate from the previous group. Children can get interested in the games their parents play, and if it's something casual, they can even start playing them. Children are interested in something more modern and topical due to the emerging ability to analyze the world around them more deeply.

14-18 years old - teenagers. At this age, the sphere of interests changes dramatically and finally ceases to be childish. Teenagers follow fashion, popular games. Boys can begin to take a more serious interest in games and, in principle, they can already play adult midcore games. Girls at this age can also play, but rather in more gentle and win-win casual games.

19-24 - youth. The stage at which the player has already formed a set of genres and mechanics that he likes. A potential player at this age will scroll through, for example, a shooter and strategy in search of an RPG without looking. Also, it is important to note that at this stage the audience becomes paying. If in the first two and a half stages the game should be of value and interest not only for the child, but also for the parent (so that children can buy it at all or make in-game purchases), then it's time to please the player specifically. In descending order of numbers, young people are the audience of midcore and casual and hardcore games.

25-35 - adults. At this stage, hardcore games gradually fade into the background. The adult age is work, relationships, family, and possibly children, so the player cannot, in principle, pay as much attention, time and money to games as before. If we talk about adult players, then these are mostly casual games in the subway on the way to work, or midcore games for a couple of hours after work at home.

* 1. **Intended Use**

The use of computer learning games in education is an urgent trend due to the active introduction of information and communication technologies in the educational process. The use of computer games in education is not a new idea. There are still debates about the harm and benefits of using them in training. Recall the words of the English philosopher and sociologist Herbert Spencer: "The game can be used for educational purposes." Currently, the use of gaming technologies increases the efficiency of the educational process not only in primary school, but also in the main school. The educational computer game has a powerful pedagogical potential. It allows you to master the necessary knowledge and skills through activity, train practical skills, check and control the assimilation of the material. It is a means of activating cognitive activity and contributes to the mental development of students.

When using computer educational games in the classroom, the question arises about the quality of such a game and the place of its application. The quality of computer training games is assessed by the presence of training goals, the balance of the game and a training component, a technologically competent implementation of the game interface. At each stage of the lesson, a certain type of game is used. Any computer game used in the classroom should have educational purposes. A game is considered good if it is dominated by a learning component. The value of a computer game will be great if the game and training goals are achieved simultaneously. By completing game tasks, achieving the game goal, the player simultaneously implicitly achieves the learning goal

* 1. **Scope**

There are two main areas of application of computers in teaching activities. The first of them is related to traditional computer-assisted learning.

Sometimes this is called computer support for traditional learning. At the same time, an appropriately programmed computer is used to solve various didactic tasks:

1) presentation of information in different forms (verbal, visual, experimental);

2) formation of students' general academic and special knowledge and skills in specific subjects;

3) monitoring, evaluation and correction of learning outcomes;

4) organization of individual and group training;

5) management of the learning process.

The second area covers computer-based learning. In this case, the computer performs the functions of a bank of pedagogical information: collects, stores in its memory and makes available to the teacher a variety of data about students (about their academic success, interests, character traits, their health status, social status among peers and others, etc.). For teachers, the opportunities provided by the use of electronic database management tools for the analysis and modeling (creative design) of learning processes, long-term tracking and testing of pedagogical hypotheses are also important. All global characteristics of statistical assessments of the effectiveness of the education system are processed in developed countries exclusively with the help of specially compiled software packages.

The general purpose of using a computer in the teaching activity of a teacher is to radically increase the effectiveness of teaching students with a new algorithmic type of thinking.

1. **Overall Description**

Teaching a child geometric shapes should take place in stages. You need to start new figures only after the baby remembers the previous ones. The simplest figure is considered to be a circle. Show the child round objects, feel them, let the baby hold his finger on them. You can also make an application of circles, make a circle of plasticine. The more sensations associated with the concept being studied, the child will receive, the better the baby will remember it.

Many parents are visited by the question of whether young children need to get acquainted with geometric shapes. Experts believe that it is optimal to start classes in a playful relaxed form from the age of 1.5. Up to this age, it is appropriate to pronounce to the child the names of the shapes of objects that the baby meets in real life (for example, "round plate", "square table").

One of the most important properties that give a child an idea of the world around them is the shape of objects. Knowledge of figures is necessary for the development of logic, spatial thinking and mathematical abilities, so it is very important for parents to start introducing the child to geometric shapes in time. At the age of 2-3 years, the baby is already ready to study such simple shapes as circle, square, triangle, rectangle, rhombus and oval, and our children's games will become indispensable assistants in the difficult learning process.

Fun game tasks will introduce the child to the names of geometric shapes, help to remember what each figure looks like, and also teach them to distinguish them from each other. In order for new knowledge to be easily assimilated and the child does not have confusion, start learning from one form, and only after the baby remembers it well, start studying the next one. Our online games are perfect even for those kids who can't read at all, because all the tasks are voiced in a pleasant voice. Therefore, turn on the sound and start exciting learning activities!

In order for the child to be interested, learning geometric shapes should take place in a playful way. You should also select bright and colorful materials for classes (they can be purchased in the store or made with your own hands). Here are some examples of games and tutorials for learning geometric shapes:

Sorting. Games with sorter can be started as early as 1 year. Invite your child to find a window for the figure. So the child will not only memorize geometric shapes, but also develop fine motor skills, thinking and spatial representations, because in order for the part to get into the hole, you need to turn it at the right angle. You can sort any other items, for example, constructor elements, Dienes blocks or counting material.

Frame inserts. In fact, this manual is similar to the sorter. For each geometric shape, it is necessary to find its place.

Geometric lotto. To play, you will need a field with the image of geometric shapes and handouts with each figure separately. A child can take small cards out of a chest or bag, and then look for their place on the playing field. This game also perfectly trains the attention of the baby.

Geometric application. Cut out various geometric shapes from paper and make a picture of them together with the child (for example, you can make a Christmas tree out of triangles, a house out of a square and a triangle).

Teaching the basics of geometry at preschool age is an important part of the formation of mathematical and sensory representations in a child. Familiarity with the figures should occur gradually (at first simple shapes - circle, square, triangle). To make it interesting for the kid, study geometric shapes in a playful way. Your assistants in this can be such educational aids as frame inserts, mosaics, lotto, sorters, sets of geometric shapes and bodies, stencils. You can also study geometric shapes on the street: just talk to your child about what you see around you and what shapes these objects look like. Then the kid will definitely learn to distinguish geometric shapes and remember their names.

1. **System Features and Requirements**

Basic elements

Depending on the methodology used (flexible or waterfall), the level of formality and detail in the SRS will vary, but in general the SRS should include a description of functional requirements, system requirements, technical requirements, limitations, assumptions and acceptance criteria. Each of them is described in more detail below:

Driving forces of business

Business model

Functional and system requirements

Use cases in business and system

Technical requirements

System qualities

Limitations and assumptions

Acceptance criteria

Driving forces of business

This section describes the reasons why the customer wants to build the system. The rationale for the new system is important because it will determine the decisions made by business analysts, system architects and developers. Another good reason for documenting the business case of the system is that the customer can change personnel during the project. Documentation that clearly defines the business reasons for the system will help support the project if the original sponsor leaves.

Technical requirements

This section is used to list any "non-functional" requirements that essentially embody the technical environment in which the product should work and include the technical constraints in which it should work. These technical requirements are crucial for determining how the higher-level functional requirements will be decomposed into more specific system requirements.

System qualities

This section is used to describe the "non-functional" requirements that determine the "quality" of the system. These items are often called "abilities" because most of them end in "skills". They included such elements as: reliability, availability, ease of maintenance, security, scalability, maintainability.

* 1. **Functional Requirements**

Functional requirements are translated into a dictionary that an organization can use to describe its products intended for design, processing and production. The purpose of this step is to develop a list of design and technical requirements that need to be worked on in order to meet functional requirements.

Further, the relationships between design and technical requirements, as well as functional requirements, are established to determine the relative importance of various design requirements. Each functional requirement in the horizontal part is compared with the design requirements in the vertical part. The degree of kinship is marked at the intersection; the degree of relationship

To perform this type of processing, a typical router system (based on software or hardware) implements three stages: input processing (processing channel layer processing to receive an IP packet), forwarding (implementation of RFC 1812 functions, including forwarding search) and output. processing (queuing and scheduling the processing of packets and the channel layer for transmission). We will discuss these data plane functions in more detail later. In particular, in this chapter we will focus on search, and in chapter 10 we will focus on planning.

**3.2External Interface Requirements**

User Interfaces

Document user interface design details, such as layouts of specific dialog boxes, in a separate user interface specification, not in the SRS. Including screen layouts in SRS to convey a different view of requirements is helpful, but make it clear that layouts are not an approved screen design. If SRS defines an extension of an existing system, sometimes it makes sense to enable the display of the screen in the form in which it should be implemented. Developers are already limited by the current reality of the existing system, so you can know in advance what the modified and possibly new screens should look like.

Hardware interfaces

Describe the characteristics of each interface between the software and hardware components of the system. This description may include supported device types, data and control interactions between software and hardware, and communication protocols used.

Software interfaces

Describe the relationships between this product and other software components (identified by name and version), including databases, operating systems, tools, libraries, and integrated commercial components. Specify the purpose of the messages, data, and controls exchanged by the software components. Describe the services required for external software components and the nature of inter-component communication. Define the data that will be shared by the software components. If the data sharing mechanism needs to be implemented in a certain way, for example, in the global data area, specify this as a limitation.

Communication interfaces

Specify the requirements for all communication functions that the product will use, including email, web browser, network communication protocols and electronic forms. Determine any appropriate formatting of the message. Specify communication or encryption security issues, data transfer rates, and synchronization mechanisms.

**3.3System Features**

The use of computers in education, including preschool, has ceased to be an unusual phenomenon. The characteristics and capabilities of modern computers and software are constantly improving. The ability of a computer to reproduce information simultaneously in the form of text, graphics, sound, speech, video, memorize and process data with great speed allows specialists to create new means of activity for children that are fundamentally different from all existing games and toys.

Advanced pedagogical experience in the use of computer technology in educational work convinces that it successfully forms readiness for learning in preschoolers with speech disorders, develops all components of speech (sound pronunciation, vocabulary, grammar, etc., arbitrary attention, concentration, children's abilities, enriches and diversifies independent children's activities, forms of communication and cooperation between adults and children

**3.4 Nonfunctional Requirements**

Nonfunctional Requirements (NFRs) define system attributes such as security, reliability, performance, maintainability, scalability, and usability. They serve as constraints or restrictions on the design of the system across the different backlogs. Also known as system qualities, nonfunctional requirements are just as critical as functional Epics, Capabilities, Features, and Stories. They ensure the usability and effectiveness of the entire system. Failing to meet any one of them can result in systems that fail to satisfy internal business, user, or market needs, or that do not fulfill mandatory requirements imposed by regulatory or standards agencies. In some cases, non-compliance can cause significant legal issues (privacy, security, safety, to name a few). NFRs are persistent qualities and constraints that, unlike functional requirements, are typically revisited as part of the Definition of Done (DoD) for each Iteration, Program Increment (PI), or release. NFRs influence all backlogs: Team, Program, Solution, and Portfolio. Proper definition and implementation of NFRs is critical. Over-specify them, and the solution may be too costly to be viable; under-specify or underachieve them, and the system will be inadequate for its intended use. An adaptive and incremental approach to exploring, defining, and implementing NFRs is a vital skill for Agile teams.

Nonfunctional requirements can have a substantial impact on solution development and testing. Architects and developers should use caution when specifying them. For example, a statement like “99.999 percent availability” may increase development effort exponentially more than “99.98 percent availability.” The impact of the NFR must be well understood by those defining requirements. In many cases, applying Set-Based Design can keep options open by initially specifying NFRs as a range (e.g., 99.98 .. 99.999). Teams explore the solution space and gain additional knowledge that leads to a better economic decision. There may indeed be value in 99.999 reliability. Or lower reliability may be more cost-effective with adjustments made elsewhere in the system’s operational environment. Physical constraints such as weight, volume, or voltage work impact solution development in similar ways. Deferring decisions to better understand costs and value often lead to better economics. The solution’s Economic Framework should contain criteria to evaluate NFRs. NFRs should be viewed in the context of trade-offs with costs and other considerations. NFRs also affect Suppliers and their knowledge and concerns should inform NFR specifications and the economic framework.

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