

Minecraft: Introduction to Artificial Intelligence. Module 1

Learning goals to give children a visual idea of programming and artificial intelligence approaches, to explain them the fundamental structures of programming languages, to develop project and teamwork skills, logical and creative thinking.

Course Syllabus:

Day one

Introduction to Minecraft. Algorithm

- introduction to Minecraft environment
- basic concepts in programming
- creating simple commands
- practical tasks on algorithms realization

Learning outcome: understood and can explain the concept of Algorithm in programming, learned how to write code for agent movement.

Practical task: write programs for agent operation using the studied commands and algorithms.

Day two

Practice creating algorithms. Loops

- consolidate algorithm knowledge and practice commands writing skill
- introduction to the concept of Loop
- write construction and building programs for Agent

Learning outcome: understood and can explain the concept of Loop and learn how to write programs using loops.

Practical task: write object construction programs for Agent using loops.

Day three

Loops. Part 1. Loops types

- consolidate knowledge on Loops concept
- Loops types
- Loops with the condition
- creation of programs using various types of Loops

Learning outcome: learned Loops types, in practice we consolidated the skills of creating programs using Loops.

Practical task: write at least 5 programs for Agent using loops.

Day four

Project work

- knowledge consolidation on basic concepts in programming
- rules of project work, resource allocation
- choosing an idea and start working on a project
- demonstration and discussion of projects created in the lesson

Learning outcome: repeated studied topics, created personal project, worked out the skills of project teamwork.

Practical task: pass module test on learned theory, choose a project, build a game object.

Minecraft: Introduction to Artificial Intelligence. Module 2

Learning goals to give children a visual idea of programming and artificial intelligence approaches, to explain them the fundamental structures of programming languages, to develop project and teamwork skills, logical and creative thinking.

Course Syllabus:

Day one

Loops. Part 2. Conditional loops. Nested loops

- Loops with a condition - repetition, consolidation in practice
- nested Loops in programming
- Agent programs creation using the studied types of Loops

Learning outcome: consolidated the skill of writing programs using conditional loops and nested loops.

Practical task: writing Agent programs for the resources extraction and building a house using conditional loops and nested loops.

Day two

Events in Minecraft

- the concept of "event" and "event handler"
- MakeCode tabs for working with events
- writing programs using events
- creating a structure from several events

Learning outcome: studied working with events, consolidated the skills of writing programs using events.

Practical task: create 10 programs using various events.

Day three

The coordinate system in Minecraft. Part 1

- coordinates in Minecraft world
- "fill with blocks" command
- creating programs using absolute and relative coordinates

Learning outcome: studied the coordinate system and learned how to determine the direction in Minecraft.

Practical task: write programs using the coordinate system and "fill with blocks" command.

Day four

Project work

- knowledge consolidation on basic concepts in programming
- rules of project work, resource allocation
- working on a project
- demonstration and discussion of projects created in the lesson

Learning outcome: repeated studied topics, created personal project, worked out the skills of project teamwork.

Practical task: pass module test on learned theory, create Village project in survival mode.

Minecraft: Introduction to Artificial Intelligence. Module 3

Learning goals to give children a visual idea of programming and artificial intelligence approaches, to explain them the fundamental structures of programming languages, to develop project and teamwork skills, logical and creative thinking.

Course Syllabus:

Day one **The coordinate system in Minecraft. Part 2**

- MakeCode Shapes tab, building shapes
- the Radius concept
- practice of creating programs using coordinates
- using "pick random position" command in programs

Learning outcome: consolidated the skill of writing programs using a coordinate system, studied the use of random values in programs.

Practical task: write programs - building an aquarium, a skating rink, filling with air, building figures.

Day two **The coordinate system in Minecraft. Part 3**

- using coordinates to clone objects
- using loops in cloning programs, "fill with blocks" command
- variables in the program code
- improvement of the cloning program using variables

Learning outcome: learned how to use the cloning command in programs, consolidated programming skills using loops and cloning commands.

Practical task: create a program using loops in cloning of an object.

Day three **Builder in Minecraft**

- introduction to Builder and exploring his work
- creation of programs for working with Builder
- programming practice: creating game objects using Builder and cloning

Learning outcome: learned how to use Builder in our programs, consolidated programming skills using loops, cloning, and Builder.

Practical task: practice tasks working with Builder, write programs to create game objects - islands, bridges, lanterns, balloons, etc.

Day four **Project work**

- knowledge consolidation on basic concepts in programming
- rules of project work, resource allocation
- creating a project
- demonstration and discussion of projects created in the lesson

Learning outcome: repeated studied topics, created project, worked out the skills of project teamwork.

Practical task: pass module test on learned theory, create Floating Village project .

Minecraft: Introduction to Artificial Intelligence. Module 4

Learning goals to give children a visual idea of programming and artificial intelligence approaches, to explain them the fundamental structures of programming languages, to develop project and teamwork skills, logical and creative thinking.

Course Syllabus:

Day one

Variables. Part 1

- variables in programming
- how to create a variable and set its value
- practice of writing programs using variables

Learning outcome: learned how to use variables in our program.

Practical task: write programs - Building a pyramid, Jumping power, Calculator, Bat cave.

Day two

Variables. Part 2

- knowledge consolidation on variable concept
- algorithms using the "while" loop and conditional operator
- programming practice: creating programs using variables and conditional operator

Learning outcome: studied the concept of "conditional operator", consolidated programming skills using variables and conditional operators.

Practical task: write programs - Agent-woodman, Stopwatch, Arrow counter.

Day three

Conditional operator. Part 1

- studying the conditional operator concept
- conditional structures in programs
- the "else" operator

Learning outcome: learned how to create and use conditional operators and structures in programs.

Practical task: create a mini-game with the victory and defeat conditions, create equality check program.

Day four

Project work

- knowledge consolidation on basic concepts in programming
- rules of project work, resource allocation
- start creating a consolidated project
- demonstration and discussion of works created in the lesson

Learning outcome: repeated studied topics, started creating consolidated project, worked out the skills of project teamwork.

Practical task: pass module test on learned theory, choose the idea of a consolidated project and personal roles in it, work on your part of the project.

Minecraft: Introduction to Artificial Intelligence. Module 5

Learning goals to give children a visual idea of programming and artificial intelligence approaches, to explain them the fundamental structures of programming languages, to develop project and teamwork skills, logical and creative thinking.

Course Syllabus:

Day one

Conditional operator. Part 2

- the task of the "House of Quests" project
- programming practice: programming the quest rooms
- project testing, discussion of issues and results

Learning outcome: consolidated the skills of writing programs using conditional structures, completed a mini-project "House of Quests".

Practical task: program 5 rooms in the "House of Quests" project.

Day two

Conditional structures. Part 1

- preparation for solving the problem of population census
- writing a program to check the entered value
- writing a program to output the received data in the chat
- programming practice: writing a program for analyzing data on the population census in a prepared village.

Learning outcome: consolidated the skills of creating conditional structures in programs, wrote a program for analyzing the results of the population census.

Practical task: create a program for checking the entered value, perform a population census and analyze the results of the census.

Day three

Conditional structures. Part 2

- the task of writing a program for the maze construction
- using functions in programs
- writing the "agent's dance" program

Learning outcome: consolidated the skills of creating conditional structures in programs, wrote two programs using functions and conditional structures.

Practical task: create a program for maze construction, write a program "agent's dance".

Day four

Project work

- knowledge consolidation on basic concepts in programming
- rules of project work, resource allocation
- continue to create a consolidated project
- demonstration and discussion of works created in the lesson

Learning outcome: repeated studied topics, continued to create consolidated project, worked out the skills of project teamwork.

Practical task: pass module test on learned theory, work on personal part of a consolidated project.

Minecraft: Introduction to Artificial Intelligence. Module 6

Learning goals to give children a visual idea of programming and artificial intelligence approaches, to explain them the fundamental structures of programming languages, to develop project and teamwork skills, logical and creative thinking.

Course Syllabus:

Day one

Functions. Part 1

- functions in programming, function parameters
- programming practice: "Burger" program
- programming practice: functions with parameters
- the program "Building walls"

Learning outcome: learned how to use functions and function parameters in our programs.

Practical task: writing a program for creating a Burger and building walls.

Day two

Functions. Part 2

- preparing to create a game
- creating the "Arena" function
- creating functions for game settings
- creating a function for placing mobs
- creating a program with a winning condition.

Learning outcome: repeated the studied topics in practice, created a game in Minecraft.

Practical task: preparing functions for creating a game, assembling and testing the Arena game.

Day three

Array

- the concepts of "array", "array element" and "array index"
- creating an array and getting values from an array
- programming practice: we write programs using arrays

Learning outcome: studied the concept and use of arrays in programming, wrote two programs using arrays.

Practical task: write programs "Teleporting belt", "Rainbow lighthouse", "Zoo".

Day four

Project work

- knowledge consolidation on basic concepts in programming
- continue to create a consolidated project
- demonstration and discussion of works created in the lesson

Learning outcome: repeated studied topics, continued to create consolidated project, worked out the skills of project teamwork.

Practical task: pass module test on learned theory, work on personal part of a consolidated project.

Minecraft: Introduction to Artificial Intelligence. Module 7

Learning goals to give children a visual idea of programming and artificial intelligence approaches, to explain them the fundamental structures of programming languages, to develop project and teamwork skills, logical and creative thinking.

Course Syllabus:

Day one

Function parameters

- repetition of the concepts of "array", "function"
- discussion: analysis of the program code with the history of mobs in Minecraft and suggestions for improvement
- building the Walking statue - discussing the program code
- programming practice: programs using arrays and functions

Learning outcome: repeated the concept and use of arrays and functions in programming, wrote programs using functions and arrays.

Practical task: create programs "The History of Minecraft", "Walking statue", "Colosseum".

Day two

Introduction to JavaScript syntax

- JavaScript commands syntax
- using event handlers in JavaScript
- programming practice: creating commands for Agent in JavaScript
- variables and data types in JavaScript programs

Learning outcome: learned how to work with variables in JavaScript, learned how to write simple programs in JavaScript.

Practical task: write commands in JavaScript, create programs "Agent passes a corridor", "Line of blocks".

Day three

Loops and conditions in JavaScript

- "for" loop and its use in programs
- "while" loop and its application
- "if statement" and its application in programming
- programming practice: tasks for the use of loops and if statements

Learning outcome: studied the "for" and "while" loops, learned how to use "if statement" in the program.

Practical task: creation of programs for the construction of a tower, numbers output, "Timer", "Stopwatch".

Day four

Project work

- knowledge consolidation on basic concepts in programming
- continue to create a consolidated project
- demonstration and discussion of works created in the lesson

Learning outcome: repeated studied topics, continued to create consolidated project, worked out the skills of project teamwork.

Practical task: pass module test on learned theory, work on personal part of a consolidated project.

Minecraft: Introduction to Artificial Intelligence. Module 8

Learning goals to give children a visual idea of programming and artificial intelligence approaches, to explain them the fundamental structures of programming languages, to develop project and teamwork skills, logical and creative thinking.

Course Syllabus:

Day one **Arrays and functions in JavaScript**

- declaring an array and working with array elements in JavaScript
- declaring and calling a function in JavaScript
- local and global variables, function parameters
- programming practice: tasks for the use of arrays and functions.

Learning outcome: learned how to create arrays and use functions in JavaScript, fixed the skills of creating programs in JavaScript.

Practical task: write the code using functions and arrays, create of programs "Building a wall", "Rainbow".

Day two **Conditional statements in JavaScript**

- repetition of conditional structures in programming
- "else", "else if" statements in JavaScript
- programming practice: programs using conditional structures

Learning outcome: learned how to work with conditional structures in JavaScript, worked out the skill of writing programs using conditional structures in JavaScript.

Practical task: create programs "Checking the answer to the question", "Your biography", programs for working with random numbers.

Day three **Completion of a group project**

- complete to create the group project
- programming practice: writing programs in JavaScript on the topics studied
- demonstration and discussion of the works created in the lesson.

Learning outcome: completed the creation of a group project, worked out the skills of project teamwork.

Practical task: write programs "Building a column", "Rain of chickens", "Multicolored floor" in JavaScript using the studied programming structures, working on personal part of a group project.

Day four **Project presentation**

- pass final test on course learned topics
- preparation for the presentation of course projects
- discussion of the course results
- recommendations for further study and development in the field of programming

Learning outcome: consolidated the knowledge gained during the course, presented joint project, and received recommendations for further study.

Practical task: take part in project presentation.