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School of Engineering

Integrated Engineering

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**C++**

Third homework in course IAX0584

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Tallinn 2025

# AUTHORS DECLARATION

I confirm that I have prepared this homework independently and that it has not been previously submitted for defense by someone else. All the works of other authors used in the preparation of the work, important points of view, data from literary sources and elsewhere are cited in the work.

Author: Emma Hansson

Date: 29.04.2025

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# TASK STATEMENT

The task is to construct code in C++, with class usage and OOP principles, based on either homework 1 or homework 2. I chose to modify homework 2.

## Specific task

## Specific task was option R-21:

Create an algorithm and the corresponding program (in C++ ):

1.From the keyboard, the real numbers X(⏐X⏐<1) ja ε (0<ε<1) are entered;

2. Using a recursive function, a real array A is formed with elements

A1 = X,

A2 = –1/2 \* X3/3,

A3 = 1/2 \* 3/4 \*X5/5,

A4 = –1/2 \* 3/4 \* 5/6 \* X7/7,

. . .

up to the number of elements L of array A either satisfies the condition ⏐A(L) – A(L – 1) ⏐ ≤ ε or (if this condition is not satisfied) L = 15;

3. The number L of the elements of the array A and the elements itself are output to the file F with indexes.

# Code in C++

A screen shot of a computer program

AI-generated content may be incorrect.

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A screen shot of a computer program

AI-generated content may be incorrect.

A computer screen shot of a program code

AI-generated content may be incorrect.

## 2.1. Workflow

Simple description of the workflow of programme:

**How it Works Step-by-Step:**

1. **Starting the Machine:** The main() function is where the program starts. It creates an ArrayGenerator object, which is like turning on the machine.
2. **Getting Input:** The machine first asks you to enter the numbers x and epsilon using the getInputX() and getInputEpsilon() functions.
3. **Making the List:** The generateArray() function calculates the numbers for the list, following the given formula.
4. **Saving the List:** The writeArrayToFile() function saves the generated list of numbers to a file.
5. **Finishing:** The program finishes.

**AI contribution:**

A task description, and essential code in C++ (I wrote as much as I knew how to write), was given to code generating AI. It created functions and modified the code to have classes and OOP requirements.

# EXECUTION

Input1: X = 0,9 and epsilon = 0,1

Output1:

A screenshot of a computer program

AI-generated content may be incorrect.

Input2: X = epsilon = 0,5

Output2:

A screenshot of a computer program

AI-generated content may be incorrect.

# REFERENCES

Vladimir Viies. (2022). Homework formatting requirements.

Google. (2023). https://gemini.google.com/app (29.04.2025).