

# **First steps with Geant4**

## **Report of Contributions**

Contribution ID: 1

Type: **not specified**

# Introduction

*Monday 19 May 2025 14:00 (1h 30m)*

- scope and goal of this course
- a short introduction to Geant4
- introduction of some important Geant4 concepts such as run, event, track, etc.

**Presenter:** NOVAK, Mihaly (CERN)

Contribution ID: 2

Type: **not specified**

## Preliminaries

*Monday 19 May 2025 15:50 (2 hours)*

- introduction of our work environment (i.e. the virtual machine installation, demystification of Geant4 install and CMake configuration, etc.)
- recapitulation of some object oriented concept of C++ crucial for the course (such as interface and their usage)

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Contribution ID: 3

Type: **not specified**

## Detector Description

*Tuesday 20 May 2025 14:00 (1h 30m)*

- introduction of the G4VUserDetectorConstruction interface
- introduction to the Geant4 geometry description
- introduction to the Geant4 material description

**Presenter:** NOVAK, Mihaly (CERN)

Contribution ID: 4

Type: **not specified**

## Implementation of the Detector-Construction of our application

*Tuesday 20 May 2025 15:50 (2 hours)*

We will develop the main of our application.

Then we will start to implement its mandatory components:

- first the DetectorConstruction, i.e. the detector geometry and material description

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# Completing the Detector-Construction implementation

*Wednesday 21 May 2025 14:00 (1h 30m)*

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## Primary Particle Generation

*Wednesday 21 May 2025 15:50 (2 hours)*

Topics:

- a (very basic) look behind multi-threaded Geant4
- introduction of the G4VUserPrimaryGeneratorAction and usage
- introduction of G4VUserActionInitialization interface
- implementation of the primary generator of our application

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## Complete the primary generator implementation

*Thursday 22 May 2025 14:00 (1h 30m)*

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## Introduction of some more Geant4 user actions

*Thursday 22 May 2025 15:50 (2 hours)*

We will revisit the key Geant4 concepts (run, event, step) related to actions

Introduce of the Actions and the related Geant4 interfaces

- Stepping Action (G4UserSteppingAction),
- Event Action (G4UserEventAction),
- and RunAction G4UserRunAction,

Implement the remaining user actions of our application.

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Type: **not specified**

## Using UI commands to add flexibility to our application

*Friday 23 May 2025 14:00 (1h 30m)*

- introduction to Geant4 UI commands
- implementing UI commands to allow us to change of the target material, thickness at run-time

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Contribution ID: **10**

Type: **not specified**

## Recap

*Friday 23 May 2025 15:50 (2 hours)*

- Use the application we developed
- Compare the results with experimental data
- Summary of the course and outlook

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