Updates on B & E Examples

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Outline

- New extended examples since the last CM
- Ongoing Common Tasks

- See also presentations in the Parallel 3A session

New Extended Examples - 1

- hadronic/particleFluence
- Alberto Ribon
  - Dedicated test for particle fluence in four setups: **Layer, Sphere, ConcentricSpheres** and **Calo** (cylindrical colorimeter)
  - For regression testing – comparing Geant4 versions
- medical/dna/moleculardna
- Hoang Tran
  - This example shows how to simulate physics, physico-chemistry and chemistry processes in DNA geometries.Demonstrates

New Extended Examples - 2

- parameterisation/Par04 (in 11.0)
- Anna Zaborowska
  - Demonstrates how to use the Machine Learning (ML) inference to create energy deposits as a fast simulation model using ONNX runtime and LWTNN libraries.
  - The model used in this example was trained externally (in Python) on data from this examples' full simulation and can be applied to perform fast simulation. The python scripts are availbale in the training folder.

- runAndEvent/RE07
- Jonas Hahnfeld
  - Demonstrates how to register specialized tracking managers for a particle or a set of particles.
  - It is based on extended/electromagnetic/TestEm3

New Extended Examples - 3

- In preparation (for Geant4 11.1), not yet committed in GitLab
- parameterisation/gflash/gflashb:
- I. Semeniouk
  - new gflash example for sampling calorimeter while all existing examples show usage in homogeneous media)

- medical/dna/dnadamage2:
- Naoki Dominguez Kondo
  - new example that scores DNA damage using plasmids

Common Ongoing Tasks

- Followed at the WG wiki:
  - https://twiki.cern.ch/twiki/bin/view/Geant4/NoviceExtendedExamples
- Coding Guidelines
  - Updated in 2021 - **Version 2.1** (at the new Geant4 web site)
  - Reasonably low number of violations, except for 1 example (planned to be fixed for 11.0)
  - The list of violators (examples files) of naming conventions was moved from the wiki page in GitLab as an issue:
    - https://gitlab.cern.ch/geant4/geant4-dev/-/issues/144
- Macro and UI Commands Review
  - Progressing slowly, the biasing examples commands/macros reviewed for 11.1 release

Clang Tools: clang-format

- https://clang.llvm.org/docs/ClangFormat.html
- Tool for formatting code, configurable formatting style
- Can enforce some guidelines which we have already in place: long lines, tabulation
- The configuration for Geant4 source code (.clang-format file in the top geant4 directory) is discussed at Gitlab Issue #97
  - Most of updates discussed here were already merged in master
- The G4 default configuration will be updated in the examples specific configuration file (examples/.clang-format) to get includes ordering appropriate for the G4 applications
  - The examples classes includes should be defined before G4 classes
  - MR #3073 thanks to Ben Morgan

Clang-tidy

- https://clang.llvm.org/extra/clang-tidy/
- Tool providing an extensible framework for diagnosing and fixing typical programming errors, like style violations, interface misuse, or bugs that can be deduced via static analysis.
- Presented by Ben Morgan at the last Collaboration Meeting (slides)
- The checks can be defined via `.clang-tidy` configuration file or can be applied one by one
- The list of recommended checks was discussed at Gitlab Issue #94 and the agreed lists of checks are now included in the Geant4 Coding Guidelines document
- All these checks were applied **in all basic examples**
- We can encourage the examples developers to go on also with the extended examples