

Introduction to Abaqus Scripting

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Agenda

- **4 Days of Training**

- DAY 1:
 - Overview of Scripting in Abaqus
 - Introduction to the Python Core Language – part 1
- DAY 2:
 - Introduction to Abaqus Scripting Interface
- DAY 3:
 - Introduction to the Python Core Language – part 2
- DAY 4:
 - Making effective use of the Abaqus Scripting Interface

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Course Objectives

- **This advanced seminar will introduce you to:**
 - The *Abaqus Scripting Interface (ASI)*
 - The core functionality of the Python language.
- **Objectives**
 - Help students to develop a high level understanding of the Abaqus scripting capabilities.
 - Organize and present the technical details of Python and the Abaqus Scripting Interface.
 - Expose the strengths and weaknesses of Abaqus scripting.
 - Encourage the student to use scripting in new ways.



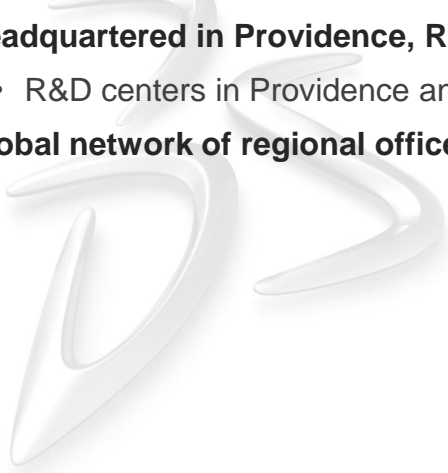
Course Objectives

- **What is not covered:**
 - This advanced seminar **will not** address the details that are necessary to write scripts that affect the Graphical User Interface (GUI).
 - Separate training material is available for GUI scripting.
 - If you are interested in GUI scripting, contact your SIMULIA representative.



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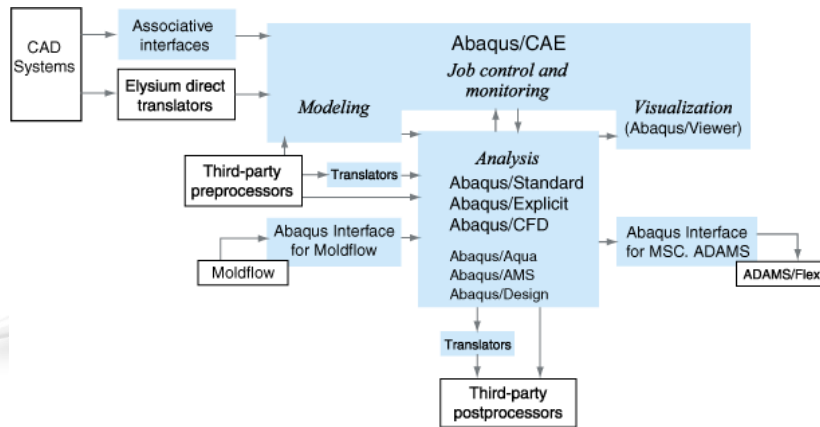
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What is Abaqus FEA?

- Suite of finite element analysis modules



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Introduction to Abaqus Scripting



Revision Status

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|-------------|------|------------------|
| Lecture 1 | 5/11 | Updated for 6.11 |
| Lecture 2 | 5/11 | Updated for 6.11 |
| Lecture 3 | 5/11 | Updated for 6.11 |
| Lecture 4 | 5/11 | Updated for 6.11 |
| Lecture 5 | 5/11 | Updated for 6.11 |
| Workshop 1 | 5/11 | Updated for 6.11 |
| Workshop 2 | 5/11 | Updated for 6.11 |
| Workshop 3 | 5/11 | Updated for 6.11 |
| Workshop 4 | 5/11 | Updated for 6.11 |
| Workshop 5 | 5/11 | Updated for 6.11 |
| Workshop 6 | 5/11 | Updated for 6.11 |
| Workshop 7 | 5/11 | Updated for 6.11 |
| Workshop 8 | 5/11 | Updated for 6.11 |
| Workshop 9 | 5/11 | Updated for 6.11 |
| Workshop 10 | 5/11 | Updated for 6.11 |
| Workshop 11 | 5/11 | Updated for 6.11 |
| Workshop 12 | 5/11 | Updated for 6.11 |

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| Workshop 13 | 5/11 | Updated for 6.11 |
| Workshop 14 | 5/11 | Updated for 6.11 |
| Workshop 15 | 5/11 | Updated for 6.11 |
| Workshop 16 | 5/11 | Updated for 6.11 |
| Workshop 17 | 5/11 | Updated for 6.11 |
| Workshop 18 | 5/11 | Updated for 6.11 |
| Workshop 19 | 5/11 | Updated for 6.11 |
| Workshop 20 | 5/11 | Updated for 6.11 |
| Workshop 21 | 5/11 | Updated for 6.11 |
| Workshop 22 | 5/11 | Updated for 6.11 |
| Workshop 23 | 5/11 | Updated for 6.11 |
| Workshop 24 | 5/11 | Updated for 6.11 |
| Workshop 24 | 5/11 | Updated for 6.11 |



Overview of Scripting in Abaqus

Lecture 1

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L1.2

Agenda

- Overview
- Examples
- Terminology
- Languages for customizing Abaqus
 - Workshop 1 - Creating a basic Abaqus script

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Introduction to the Python Core Language (Part 1)

Lecture 2

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L2.2

Overview

- **High Level Description of the Language**
- **Running Python**
 - Workshop 2 - Running Python
- **Lexical Conventions and Syntax**
- **Objects**
 - Workshop 3(optional) - Investigating Python Objects
- **Data Types**
- **Operators and Expressions**
 - Workshop 4 (optional) - Python types, operators, and expressions
- **Control Flow**
- **Functions**
 - Workshop 5 - Defining a function for a series calculations
- **Namespaces**
- **Common Issues for New Users**
- **Modules**
 - Workshop 6 - Modules

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Introduction to the Abaqus Scripting Interface

Lecture 3

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L3.2

Overview

- **Abaqus Architecture**
- **Abaqus Scripting Interface Basics**
 - Workshop 7 - Creating a Macro
- **Abaqus Object Model Basics**
- **The Session Object**
 - Workshop 8 - Working with the Session Object
- **The Mdb Object**
- **The Odb Object**
 - Workshop 9 - Working with the ODB object
- **Abaqus Data Types**
- **Abaqus Modules**
- **Setting Abaqus Defaults**
 - Workshop 10 - Setting Abaqus Defaults
- **Getting Input Interactively**
 - Workshop 11 - Getting Input Interactively
- **Parameter Studies**
 - Workshop 12 (optional) – Using the Parametric Scripting File
- **Miscellaneous**

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Introduction to the Python Core Language (Part 2)

Lecture 4

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L4.2

Overview

- **More on Running Python**
- **More on Data Types**
- **More Common Issues for New Users**
- **More on Operators and Expressions**
 - Workshop 13 – Practice Using a Few More Python Basics
- **More on Control Flow**
 - Workshop 14 (optional) – Working with Exceptions
- **Debugging Scripts**
- **Abaqus PDE**
- **More on functions**
- **More on modules**
 - Workshop 15 (optional) – A Brief Look at the Numeric Module
- **String Processing**
- **Input and Output**
 - Workshop 16 – Input and Output
- **Built-in Tools**
- **Manipulating Programs**
- **Python Packages**
- **Object Oriented Programming**
- **Python classes**
 - Workshop 17 (optional) – Classes
- **Special Method Attributes**
 - Workshop 18 (optional) – Special Method Attributes

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Making Effective Use of the Abaqus Scripting Interface

Lecture 5

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L5.2

Overview

- **More on the Odb Object**
 - Workshop 19 - Linear Superposition of Results
- **Object Model Interrogation**
 - Workshop 20 – Object Model Interrogation
- **Writing to the Odb**
 - Workshop 21 - Writing to the ODB
- **Callback Functions**
 - Workshop 22 - Monitoring a Job
- **Plug-ins**
 - Workshop 23 - Creating kernel and GUI scripts
- **Custom Data**
- **Scripting Ideas for Productivity**
 - Workshop 24 - Basic Scripting Style Considerations
- **Common Issues for New Users**
- **Not So Common Issues for New Users**
- **Working with the Keyword Block Object**
 - Workshop 25 (optional) - Working with the Keyword Block Object
- **C++ Instead of Python**
- **GUI Customization Issues**

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