Arch 355:
Computer Skills - 2

Modeling Introduction

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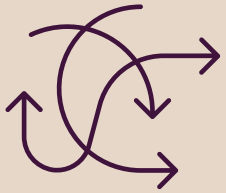
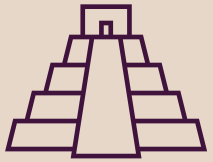
Factors influence the successful modeling approach

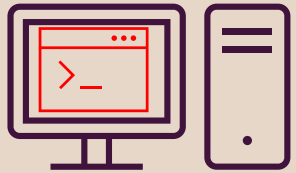
Purpose of the model



Model **Complexity**



Model **Size**



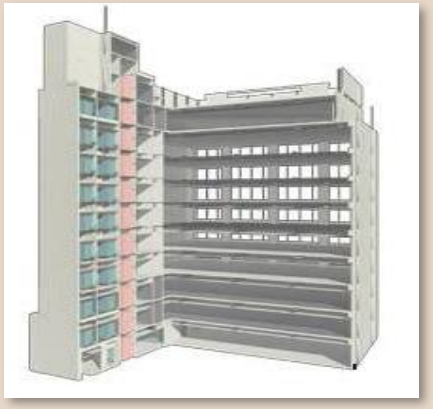
Hardware and Software

Purpose of the model

Conceptual Modeling

BIM

Visualization



Construction Coordination

Source: Graphisoft BIM Curriculum 2015

Purpose

Conceptual Modeling

1. Main purpose of the model is to help making design decisions
2. Not necessary includes the entire building (structures can be missing)
3. Accuracy is not relevant
4. Mass modeling : Level of detail is typically lower
5. Materials can be symbolic or missing

Source: Graphisoft BIM Curriculum 2015

Purpose

BIM

1. The entire building must be modeled with the corresponding architectural information (materials, spec., etc.).
2. The model must be made of real architectural elements (walls, slabs, roofs etc.) for correct calculation results.
3. Modeling detail level should be appropriate for the required drawing representations.

Source: Graphisoft BIM Curriculum 2015

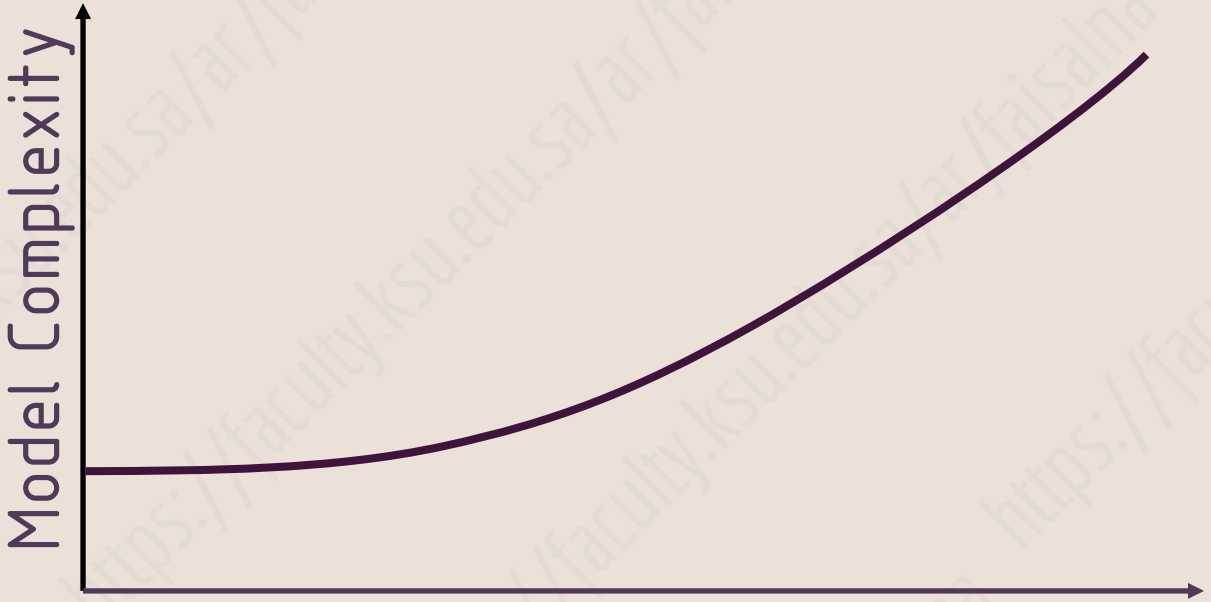
Purpose

Visualization

1. Not necessary to model the entire building.
2. Only the elements of the actual view need to be shown
3. Level of modeling detail should depend on the image quality and the distance from the camera
4. Correct texture coordination and lighting is essential

Source: Graphisoft BIM Curriculum 2015

Complexity



Naturally more sophisticated structures results bigger and more complex models. Contemporary architecture using freeform shapes and custom building elements

Source: Graphisoft BIM Curriculum 2015

Complexity

Dealing with

1. **Simplify**: The level of detail shouldn't exceed the requirements.
2. **Divide:** Split the project into smaller, logical parts and share it with the project team members.
3. **Use the appropriate tools**: Combine several applications for the best result.

Source: Graphisoft BIM Curriculum 2015

Size

What makes a model big?

1. Size of the project
2. Number of building elements
3. Number of 3D Polygons
4. Lack of teamwork
5. Inappropriate computer hardware
6. Inappropriate software usage

Source: Graphisoft BIM Curriculum 2015

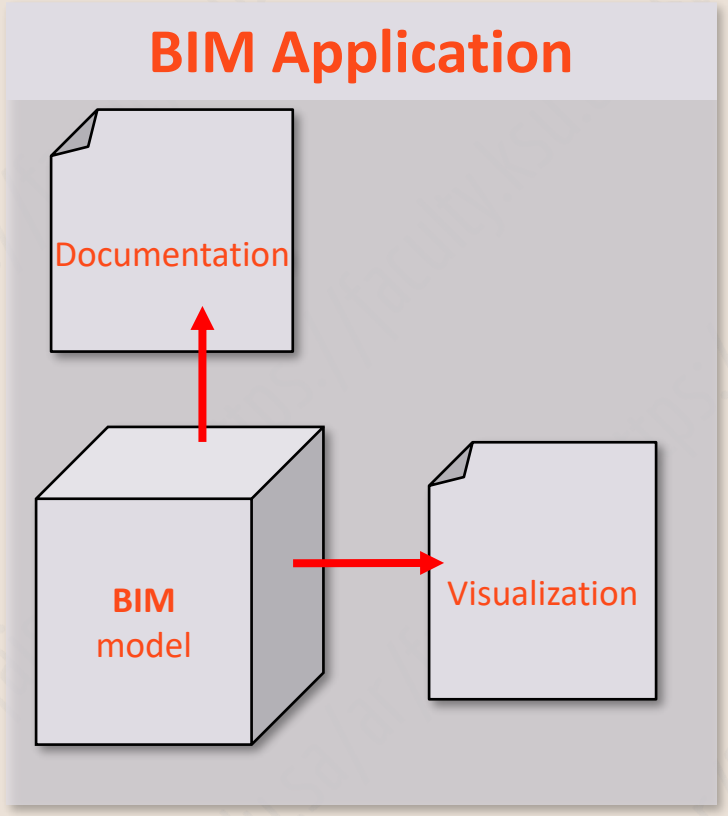
Size

Work effectively

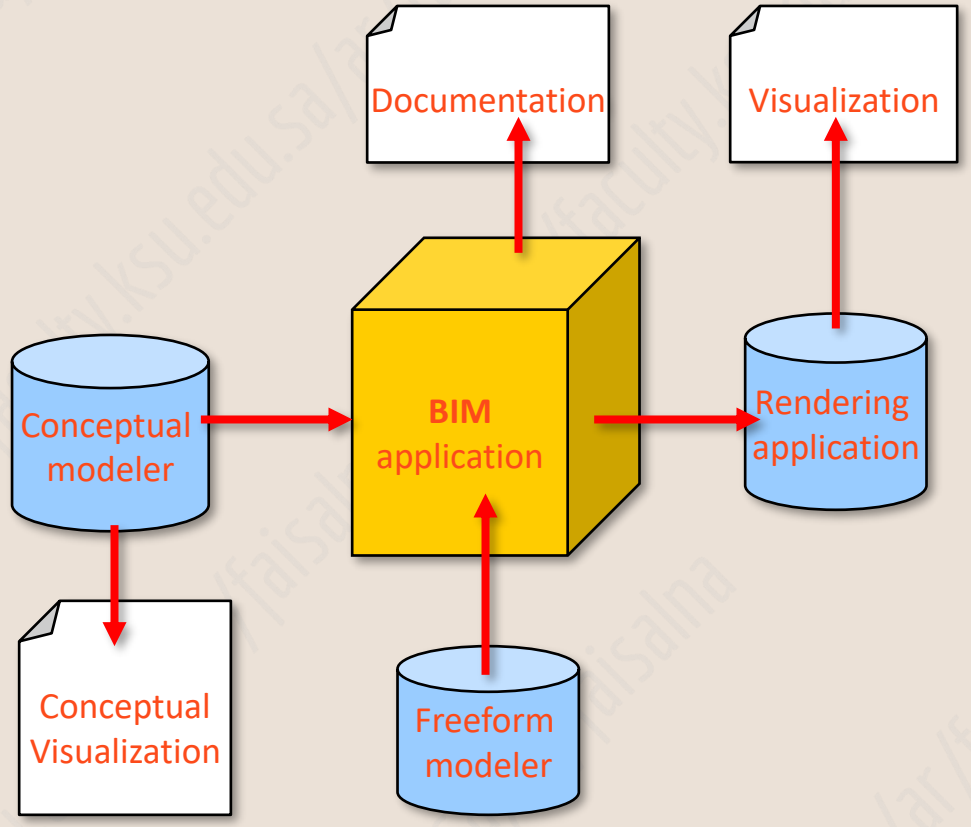
1. Reduce the number of polygons
2. Turn off the invisible elements
3. Divide the project
4. Use appropriate hardware

Source: Graphisoft BIM Curriculum 2015

Software



Classic BIM modeling approach for small to medium scale projects (All in one application)



Complex modeling and visualization solution for large or complex projects Specialized applications combined with BIM software

Source: Graphisoft BIM Curriculum 2015

Hardware

CPU

For **modeling** a CPU with the highest single-core performance possible
For **Rendering** CPU that has as many cores as possible.

RAM

Size: Project size limit
Size and Speed: Complex 3D operations

GPU (Graphic Card)

Latency in 2D and 3D navigation
GPU Rendering GPU vs CPU
Multi-GPU

Hard Disk

Size: Number of projects, backups, resources
Quality (SSD): Data safety, Response

Hardware performance

Environment

Temperature, Elec Current, ...

Optimum Settings

Details: as required

Hide unused or unseen objects

Output settings (Size, resolution, Quality)

Software-hardware integration

Lumion ------- RTX/GTX ▷

3Ds, Revit ------- Quadro ▷

Maxwell ------ only Nvidia ▷

Maintenance: Periodical, fans.

Concepts: Speed, GPU consumption.

Alternatives: Cloud rendering, Render farms.

Hardware resources

Resources Examples

Not recommended to buy from, or its Quality, just samples

Multimedia, Games

Workstation

Components

Finding the best modeling approach requires full understanding of the application's capabilities and clear definitions of the modeling goals.

Although the features of the programs can largely influence the best modeling strategy there are a few general rules that helps to keep the model size within a reasonable range in any case.

The most important rule is that the detail level of the model elements should be appropriate for the purpose of the model.

Source: Graphisoft BIM Curriculum 2015