Assignment 01: Understand and Create BIM Objects

Product data + Product geometry = BIM Object
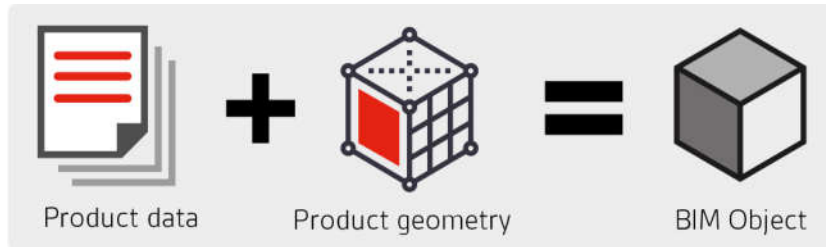
A BIM object is a repository of information that holds data regarding 2D and 3D geometry description of the actual product or component. The information container also holds information such as barcodes, U-values, sizes and branding like logo and family names. Links to maintenance documents, assembly manuals etc. are also available in the object.

Today CAD symbols are replaced by BIM objects. BIM objects still carry the representation of the products in 2D and 3D like a CAD symbol would, but they also carry so much more. In a BIM object you can also add links back to the product information, website and montage instructions. The BIM objects are smart by nature and can contain functions like how they should be operated, and of course all visual qualities.

The creation of BIM objects always starts from some original document like 2D drawings in paper or digital form (PDF/DWG). We can also build BIM objects from real physical products if this is the only option, using 3D scanners and digitising techniques, we recreate the physical form in 3D. We add information and data from product sheets and product databases to create a smart BIM object that represent the real physical product. Materials and textures are added to the objects knowledge and functions are programmed into the object if needed.

Objectives

- To study the basic concept of BIM objects.
- To create an example of BIM object using simplified tools and information.
- To document and present the BIM object in a systematic way.

Methodology

The assignment is to prepare a BIM object of your choosing. Each student should consider and select one product or component related to building construction for creating the BIM object. Examples include architectural element, furniture, structural component, chiller plant, lighting fitting, sanitary fitment, and so on. Usually, a BIM object is a combination of many information, including:

- Information content that defines the product or component.
- Model geometry representing its physical characteristics.
- Behavioural data such as detection, maintenance and clearance zones, that enable the BIM object to be positioned in, or function in the same manner as, the product itself.
- Visualization data giving the object a recognizable appearance.

The recommended software tool for creating the BIM object is SketchUp and it can be learnt and applied from the following web links. Students may also apply other software (such as Revit and ArchiCAD).

SketchUp https://www.sketchup.com/
- SketchUp Free: 3D modeling in a web browser https://www.sketchup.com/products/sketchup-free
- SketchUp Pro (free trial version) https://www.sketchup.com/products/sketchup-pro
- Video Tutorials https://www.sketchup.com/learn

Submission

Each student should submit the relevant information and file(s) of the BIM object together with clear description and representation of the proposed component. The files (such as 3D model) should be of suitable format for review purpose. The description should be neat and properly written and organized to communicate your findings. Proper credit and referencing should be provided to the information sources. Students making direct copy of the information in other publications or sources (plagiarism), if found, will be disqualified.

The file(s) of the BIM object together with the description should be submitted through the Moodle system. The assessment criteria include quality of the content, compliance with relevant standards, complexity of the object, organization and writing skills.

Submission deadline (via Moodle): [Refer to the information on Moodle]

Resources

About BIM Objects https://www.nationalbimlibrary.com/about-bim-objects
A manufacturer's guide to BIM object creation
    https://www.thenbs.com/knowledge/a-manufacturers-guide-to-bim-object-creation
BIM object https://www.designingbuildings.co.uk/wiki/BIM_object

Examples of BIM objects:
    ARCAT BIM Objects http://www.arcat.com/bim/bim_objects.shtml
    BIMcomponents https://bimcomponents.com/
    BIMobject library http://bimobject.com
    BIM&CO BIM Objects https://www.bimandco.com/en/bim_objects
    DiHub BIM Objects Marketplace http://www.dihub.com.sg/markets
    MagiCloud https://www.magicloud.com
    Polantis https://www.polantis.com/

References

NBS, 2018. *BIM Object Standard*, Version 2.0 January 2018, National Building Specification (NBS), Newcastle upon Tyne. https://www.nationalbimlibrary.com/resources/bimobjectstandard/NBS-BIM-Object-Standard-v2_0.pdf
CIC, 2015. *CIC Building Information Modelling Standard (Phase One)*, Construction Industry Council (CIC), Hong Kong. https://www.cic.hk/cic_data/pdf/about_cic/news_and_update/BIM/Eng/CIC%20BIM%20Standards_FINAL_ENG_v1.pdf

Assessment Criteria and Rubrics

Assignments are evaluated based on whether a student has presented ideas in such a way that reflects integration of course material and critical thinking skills. Grades are assigned not according to competition among students (who is "the best") but according to expectations for a particular assignment relative to the material covered in class up to that point.

This assignment requires students to study and describe the basic concept of BIM objects and their essential information by creating an example of BIM object using simplified tools. The submission should indicate synthesis of ideas and good understanding of the information requirements. The assessment rubrics are shown as follows.

Criteria (weighting%)	Levels of performance and grades			
	Insufficient (1) F	Acceptable (2) D & C	Good (3) B	Excellent (4) A
Content (40%)	Shows some thinking and reasoning but most ideas are underdeveloped and unoriginal.	Content indicates thinking and reasoning applied with original thought on a few ideas.	Content indicates original thinking and develops ideas with sufficient and firm evidence.	Content indicates synthesis of ideas, indepth analysis and evidences original thought and support for the topic.
Organization and writing (20%)	Writing lacks logical organization. It shows some coherence but ideas lack unity. Serious errors.	Writing is coherent and logically organized. Some points remain misplaced and stray from the topic. Transitions evident but not used throughout essay.	Writing is coherent and logically organized with transitions used between ideas and paragraphs to create coherence. Overall unity of ideas is present.	Writing shows high degree of attention to logic and reasoning of points. Unity clearly leads the reader to the conclusion and stirs thought regarding the topic.
Clarity and coherence (20%)	All the information is not clearly presented. Lack of coherence and logical consistency.	Some information is not clearly presented. Weak coherence and logical consistency.	The information is clearly presented. Logical interconnection and consistency are shown.	The information is clearly and effectively presented. Good coherence and logical consistency are demonstrated.
Critical thinking and Innovation (20%)	No critical thinking or innovative ideas are applied.	Some attempts to propose critical thinking or innovative ideas.	Critical thinking or innovative ideas are proposed, but no justification.	Critical thinking or innovative ideas are proposed with evaluation and justification.

Remark: To avoid plagiarism, all sources used in the report should be acknowledged and referenced throughout, in accordance with the preferred method of academic professionals.