META-META Club

WORKBOOK · MODULE 1 OF 4

The pipeline

XR for the Built Environment. Plan → Model → Walkthrough → AR, and where BIM fits.

Pro studios | 6 lessons | ~2.9 h | 5-question practice quiz | Notes pages

IN THIS MODULE

The pipeline

Plan → Model → Walkthrough → AR, and where BIM fits.

#	LESSON	TYPE	TIME	DONE
1.1	Plan → Model → Walkthrough → AR	READ	25 min	☐
1.2	BIM, ArchiCAD and IFC	READ	30 min	☐
1.3	Demo: the BIM/ArchiCAD pipeline and a floor-plate web viewer	LIVE	25 min	☐
1.4	Build-along: a floor plan turned into a shareable walkthrough	LAB	55 min	☐
1.5	Critique: walkthroughs	LIVE	25 min	☐
1.6	Ship it: a walkthrough link	PROJECT	15 min	☐

How to use this workbook

- Work through each lesson on metametaclub.com/learn, or listen to its narration, then use the page here to take notes.
- Tick the steps as you go, and write your answers under **Check yourself** before you look anything up.
- Do the practice quiz at the end, then mark it with the answer key on the last pages.
- Keep every **Ship it** piece. Together they become what you show.

Before you start

What do you already know about this, and what do you want to be able to make by the end?

LESSON 1.1 · READ · 25 MIN

Plan → Model → Walkthrough → AR

Learn the four stages of the pipeline, what each one hands to the next, and who uses each output.

Key points

The four stages

1. Plan. The design as drawings and building data, usually from an architect's BIM tool such as ArchiCAD.

2. Model. A clean 3D model built for real time.

3. Walkthrough. A space people move through: in a browser, on a desktop, or in a Quest 3 headset.

Who uses what

- **Architects** check design intent in the walkthrough.
- **Sales teams** send the link to buyers and use AR in the sales suite.
- **Buyers** walk the home before it exists and pick finishes.
- **Site teams** use the model to talk about sequence and space.

Where projects go wrong

- Treating stage 2 as an export button. It is real work: cleaning, simplifying, lighting.
- Skipping scale checks. A door that is 2.6 metres tall makes the whole home feel off.
- Building for the headset first. Most people will open a link on a phone. Build for that, then add the headset.
- Late changes. If the design changes, you need a clear route to update the model without starting over. Keep your clean-up steps as scripts where you can.

Steps checklist

- [ ] Pick a building you know: your home, campus or office.
- [ ] For each stage, write what the output would be for that building.
- [ ] Name who would use each output.
- [ ] Mark the stage you think would take longest, and why.

SHIP IT

A one-page sketch of the four stages for your chosen building, with outputs and users.

- [ ] Shipped. Link or file: _____

Check yourself

1. What is the output of each stage?

2. Why build for a phone link before a headset?

3. Why is stage 2 more than an export?

LESSON 1.2 · READ · 30 MIN

BIM, ArchiCAD and IFC

Understand how building data moves from BIM and ArchiCAD, through IFC, into a real-time scene, and what you keep and lose on the way.

Key points

The terms

- **BIM (Building Information Modelling).** A way of designing where the model holds information, not just shapes. A wall knows it is a wall, its storey, its thickness and often its materials.
- **ArchiCAD.** A BIM tool widely used by architects. It models with real building elements.
- **IFC (Industry Foundation Classes).** The open, vendor-neutral exchange format for BIM, maintained by buildingSMART. Most BIM tools can read and write it.

What IFC carries

IFC stores elements by class: `IfcWall`, `IfcSlab`, `IfcDoor`, `IfcWindow`, `IfcSpace`, grouped into storeys under an `IfcBuildingStorey`. Each element can carry properties such as fire rating or finish.

What usually gets lost

- Render materials and textures. Plan to re-make materials in Blender.
- Clean geometry. Some elements arrive heavy, with many small faces.
- Annotations and drawing-only items.

Getting IFC into a real-time scene

1. **Export from ArchiCAD.** Use the IFC export with a translator setting suited to coordination. Export only the storeys and elements you need.
2. **Open in Blender.** The Bonsai add-on (formerly BlenderBIM) reads IFC natively and keeps the element classes. Or convert with IfcOpenShell's `IfcConvert` tool, which can write glTF.
3. **Clean.** Delete hidden and tiny elements. Merge by material. Apply real materials.
4. **Export GLB.** For the browser or Unity.

Steps checklist

- [ ] Download a sample IFC file you are allowed to use, such as a published sample model.
- [ ] Open it in Blender with the Bonsai add-on, or in any free IFC viewer.
- [ ] Find three element classes and one storey in the model tree.
- [ ] Note what looks wrong: missing materials, heavy parts, odd names.
- [ ] Write down the clean-up steps you would take before a walkthrough.

SHIP IT

A short list: three IFC classes you found, and your clean-up plan.

☐ Shipped. Link or file: _____

Check yourself

1. What makes BIM different from a plain 3D model?

2. Which IFC class would you use to label rooms?

3. Name two things you usually need to redo after importing IFC.

LESSON 1.3 · LIVE · 25 MIN

Demo: the BIM/ArchiCAD pipeline and a floor-plate web viewer

Watch a building go from design data to something a buyer can walk through on a phone. You will see each hand-off in the pipeline and what can go wrong at each one.

Key points

How the demo runs

Mathew Munyao or a bench guest starts in ArchiCAD with a typical residential floor. The model is exported as IFC, brought into Blender, cleaned up, exported as GLB and loaded in a web viewer where you can step from room to room.

The pipeline in one line

Plan → Model → Walkthrough → AR. Drawings become a 3D model, the model becomes a real-time walkthrough, and the walkthrough can be placed in the real world with AR.

What to watch for

- **What survives IFC.** Walls, slabs, doors, windows and storeys come through as named building elements. Fancy render materials often do not.
- **The clean-up.** Hidden geometry, tiny details like screws and fittings, and duplicate faces get removed. Real-time scenes need fewer polygons than drawings.
- **Lighting.** Baked or simple real-time light makes the browser version feel finished.
- **The viewer.** Eye height of about 1.6 metres, walking speed, and a clear starting point at the front door.
- **The share.** One link that a sales team can send on a phone.

Steps checklist

- [ ] Draw the pipeline as four boxes in your notes.
- [ ] Under each box, write the file format going in and coming out.
- [ ] Note every problem the presenter fixes and in which box it happened.
- [ ] Write one question about the hand-off you find most confusing.

SHIP IT

Post your four-box sketch with formats and one question in the session thread.

- [ ] Shipped. Link or file: _____

Check yourself

1. Can you name the file format between ArchiCAD and Blender, and between Blender and the browser?

2. Why does a walkthrough need fewer polygons than a drawing model?

3. What should the first frame of a property walkthrough show?

LESSON 1.4 · LAB · 55 MIN

Build-along: a floor plan turned into a shareable walkthrough

Trace a simple floor plan into wall segments, let a script build the walls in Blender, and walk through the result in the browser.

Key points

Walls from a plan

Measure each wall on your plan as a start and end point in metres. A gap between two segments is a doorway.

Run it with `blender -b -P plan.py`.

Walk it in the browser

Use the GLB viewer page from week 4, or any minimal Three.js page, and swap orbit controls for first-person ones:

Steps checklist

- [ ] Pick a plan: your own home, a sketch, or a published sample plan you may use.
- [ ] Trace the walls into the `WALLS` list. Leave gaps for doors.
- [ ] Run the script and open `plan.glb` in Blender to check it.
- [ ] Load it in your viewer with the walking controls. Click to look, WASD to move.
- [ ] Set the start point at the entrance, facing in.

This lesson has code samples. They are printed in full in the lab handout (xr-built-environment-lab-1-4.pdf) and in the lesson on metametaclub.com/learn.

SHIP IT

A short recording walking from the entrance into the second room.

- [ ] Shipped. Link or file: _____

Check yourself

1. How does the script turn a start and end point into a wall?

2. Why is the camera at 1.6 metres?

3. Why does Blender's y become negative z in the browser?

LESSON 1.5 · LIVE · 25 MIN

Critique: walkthroughs

Show your walkthrough and get feedback from the point of view of the person who will use it: a buyer, a tenant or a site team.

Key points

How the critique runs

Volunteers share a browser on the Discord Stage, or post a link or recording in the session thread. Four minutes each.

The rubric

Give one "keep" and one "try" from these:

1. **Arrival.** Does the walkthrough start at the front door, facing into the space? First impressions sell homes.
2. **Scale.** Do doors, ceilings and rooms feel right? Eye height should be about 1.6 metres.
3. **Movement.** Is walking speed comfortable? Can you get stuck, or walk through walls?
4. **Clarity.** Can a buyer tell which room is which? Floor finishes, labels or furniture help.
5. **Light.** Does the space feel bright and calm, or dark and flat?
6. **Share.** Does it open on a phone in a few seconds?

Taste notes

- Empty rooms feel small. A single sofa or bed shows scale better than any label.
- Neutral, warm materials read as "finished". Pure grey reads as "unfinished model".
- Fewer, better views beat a long wander.

Steps checklist

- [ ] Choose the one route you want people to walk.
- [ ] Time how long your page takes to show something on a phone.
- [ ] Show your work when called.
- [ ] Write down the notes you get.
- [ ] Give a keep and a try to two others, from a buyer's point of view.

SHIP IT

Apply one note, then post a before and after.

- [ ] Shipped. Link or file: _____

Check yourself

1. Where does your walkthrough start, and why there?

2. What one object would most improve the sense of scale in your plan?

3. How long does it take to load on a phone?

LESSON 1.6 · PROJECT · 15 MIN

Ship it: a walkthrough link

Post your floor-plan walkthrough to the Metameta Nights gallery channel on the Metameta Club Discord as a link people can open on a phone.

Key points

What a good post has

- **The link**, hosted on any static host, or a 20 second recording if you cannot host yet.
- **The plan source.** Your own sketch, your own home, or a published sample plan you have the right to use. Never post a client's or a developer's plan without written permission.
- **How to move.** "Click, then WASD" for desktop. Say if it works on touch.
- **The pipeline.** Plan → script → GLB → browser, with any fix you needed.
- **One next step.** What you would add for a real client: furniture, finishes, AR.

Privacy and permission

Floor plans can reveal where people live and how a building is secured. Don't post the address.

Steps checklist

- [ ] Test the link in a private window and on a phone.
- [ ] Check the console for errors.
- [ ] Write the post with the five items above.
- [ ] Save `plan.py`, `plan.glb` and the viewer in a `week-6` folder.
- [ ] Leave one specific note on two other posts.

SHIP IT

Your gallery post with link or recording, plan source, controls, pipeline and next step.

- [ ] Shipped. Link or file: _____

Check yourself

1. Do you have the right to share the plan you used?

2. Does your walkthrough open on a phone?

3. Have you left the address out?

PRACTICE QUIZ

Check your module

Circle one answer for each question. The answer key is on the next page.

1. What is the order of the Virtual is Real pipeline taught here?

(A) Model → Plan → AR → Walkthrough

(B) Plan → Model → Walkthrough → AR

(C) Walkthrough → Plan → Model → AR

(D) AR → Model → Plan → Walkthrough

2. Which format usually carries the building from ArchiCAD to other tools?

(A) IFC

(B) MP4

(C) PNG

(D) USDZ

3. Which IFC class is most useful for labelling rooms in a walkthrough?

(A) IfcWall

(B) IfcSpace

(C) IfcWindow

(D) IfcSlab

4. What usually needs redoing after an IFC import?

(A) The storey structure

(B) Render materials and heavy geometry

(C) Wall thicknesses

(D) The project's units

5. Why build the walkthrough for a phone link first?

(A) Headsets cannot run walkthroughs

(B) Most people will open a link on a phone, so it reaches the most users

(C) Phones render better than headsets

(D) AR only works on phones

ANSWER KEY

Answers and why

1 · B Plan → Model → Walkthrough → AR

Drawings become a model, the model becomes a real-time walkthrough, and the walkthrough can be placed with AR.

2 · A IFC

IFC is the open BIM exchange format; it carries building elements such as walls, slabs and storeys.

3 · B IfcSpace

IfcSpace represents rooms and spaces, often with their names.

4 · B Render materials and heavy geometry

IFC keeps building structure well, but render materials and real-time-friendly geometry usually need work.

5 · B Most people will open a link on a phone, so it reaches the most users

Reach first: a link works for buyers and sales teams everywhere; add the headset version after.

NOTES

Build log and notes

SESSION	WHAT I MADE OR LEARNED	NEXT STEP