Medium breakout session results

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Problems from the talk
Can’t merge Piglit tests

• The Piglit tests can’t be merged into master.
• They check that lowering took place, but lowering is optional in the spec.
Solution

- Write unit tests in the source tree.
- Already started on this.
- Added a --lower-precision option to standalone compiler.
- Python script invokes this with various shaders and greps for float16.
Optimising out \( \text{f32} \rightarrow \text{f16} \rightarrow \text{f32} \) conversions is dodgy

- This is not a lossless conversion.
- If one day GLSL ES gains a native float16 type we can’t rely on this being safe.
Solution

- Implement a new f2fmp opcode in IR and NIR.
- Same as f2f16 except is allowed to be optimised out.
- Can be lowered to a normal f2f16 instruction after nir_op_algorithmic is finished.
Changing how NIR works is bad

• We want to fold conversion ops into instructions.
• Idea was to change NIR validation to allow opcodes with different dest size from source size.
• This might break things that are assuming this isn’t the case.
Solution

• We will move the folding into the code generation for IR3.
Might be handling builtins wrong

• The lowering pass sees builtins as opcodes which likely means we are lowering too late.
Solution

• Move the lowering pass to happen at the earliest possible point.
• Check that we still handle builtins if they appear as function calls.
Land branch

• After fixing these short term issues we can land the branch.
• For the time being this will be Freedreno-specific and behind an opt-in debug option.
Long-term
• Adopt the lowering branch so that it only marks operations as mediump without adding conversions.
• Pass the information down through to NIR.
• Make sure that it survives all of the optimisations.
• Lower at a much later stage using these hints.
• This will be good to implement the Vulkan/SPIR-V precision as well.
Thanks!