Mediump breakout session results

Neil Roberts

igalia

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 f32→f16→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!