A Artifact Appendix

A.1 Artifact check-list (meta-information)

- **Program:** The code repository for our framework along with the test suite. Note that this is already setup in the docker image.
- **Compilation:** The Lean4 toolchain, downloaded via `elan`. Note that this is already setup in the docker image.
- **Run-time environment:** Any operating system that supports Docker.
- **Hardware:** Any x86-64 machine.
- **Output:** Key theorems of the paper will be built and shown to have no unsound axioms.
- **How much disk space required (approximately)?:** 30GB
- **How much time is needed to prepare workflow (approximately)?:** 1hr
- **How much time is needed to complete experiments (approximately)?:** 5hr
- **Publicly available?:** Yes
- **Code licenses (if publicly available)?:** MIT
- **Archived (provide DOI)?:** 10.5281/zenodo.15755237

A.2 Description

A.2.1 Software dependencies. Docker is necessary to run our artifact. The Docker image has all dependencies needed to compile our framework with Lean4.

A.3 Experiment workflow

Access the docker image from 10.5281/zenodo.11519739.

```
$ docker load -i oopsla25-bv-decide.tar
$ docker run -it oopsla25-bv-decide
# | This clears the build cache,
# | fetches the maths library from the build cache,
# | and builds our framework.
$ cd /code/lean-mlir && lake clean && lake exe cache get && lake build
# | This allows to check that the key theorems of our framework are
# |guarded, and that they do not contain `sorry`s.
# Run experiments, and check that the output is as expected.
$ /code/lean-mlir/artifacts/oopsla25-bv-decide/run.sh
```

A.4 Evaluation and expected results

A.5 Miscellanous Docker Usage

To copy files for inspection from the docker container into the host, keep the container running, and in another shell instance, use the `docker cp` command to copy files from within the container out to the host:[1]

```
$ docker container ls # find   ID
$ docker cp <CONTAINERID>:<PATH/INSIDE/CONTAINER> \
            <PATH/OUTSIDE/CONTAINER>
```

[1] For more about `docker cp`, please see: (https://docs.docker.com/engine/reference/commandline/cp/)