ExploTest: Dynamic Extraction of Unit Tests

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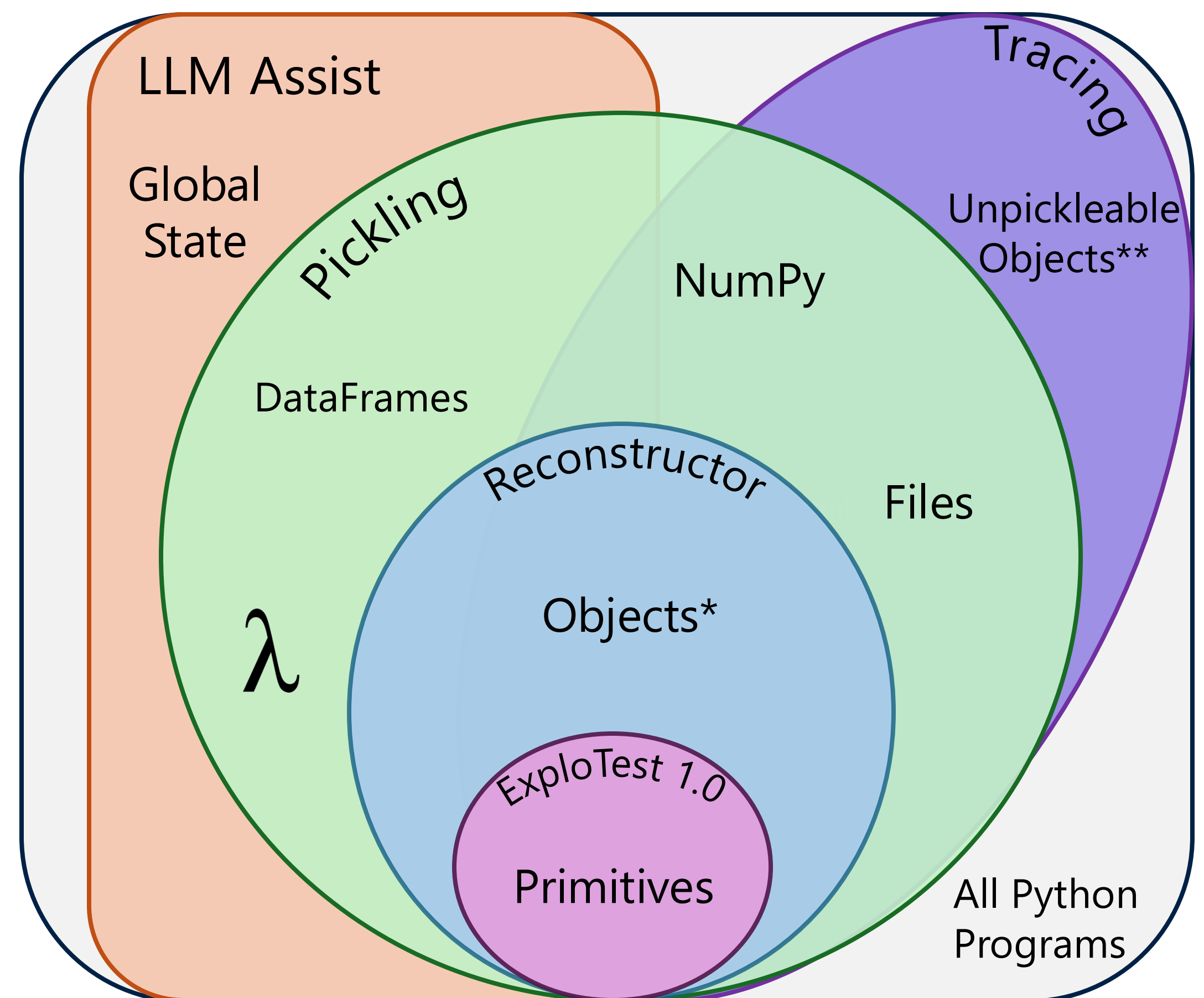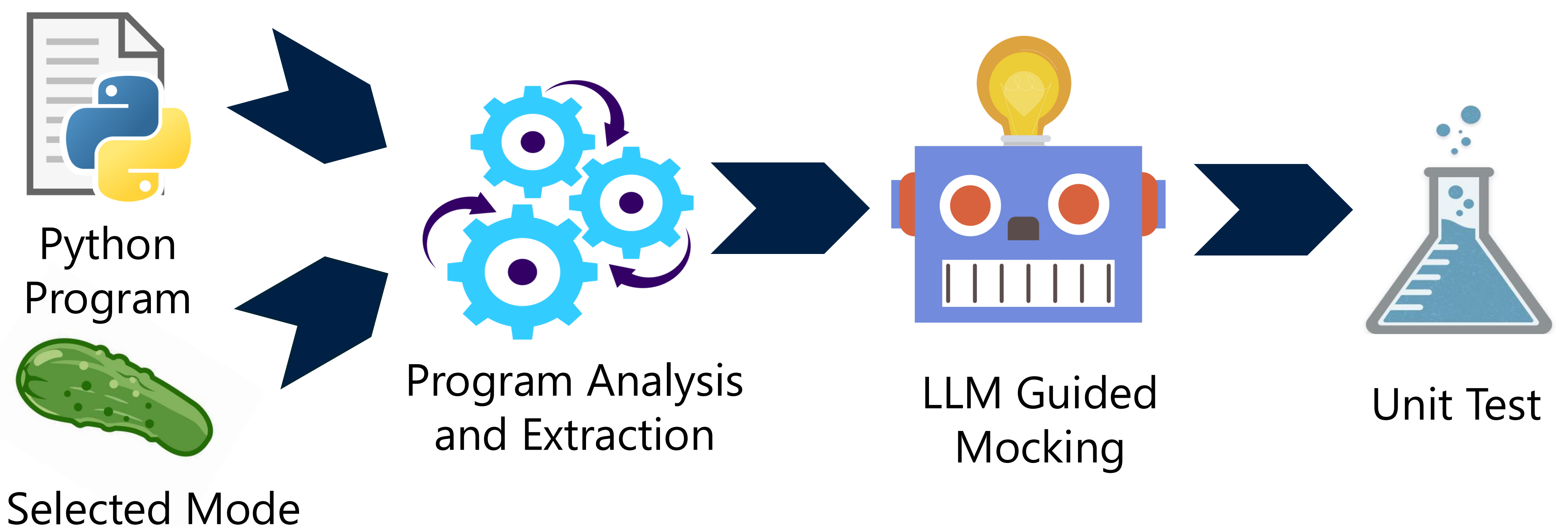
① Problem

- ✓ Software engineers are often too lazy to write unit tests
- ✓ Want test suites to support correct program evolution

② Solution: ExploTest

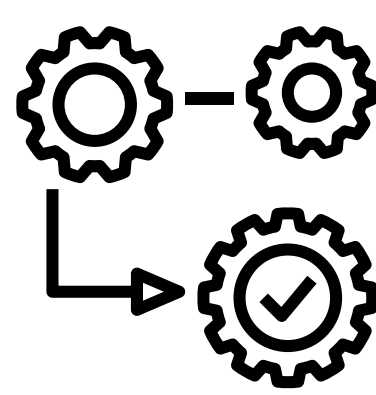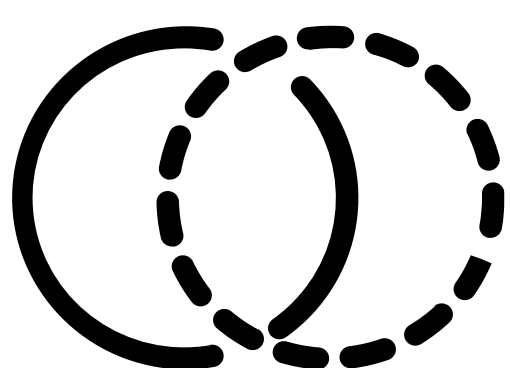- ✓ Create regression tests
- ✓ Verify argument generation

③ Approach

Python Program

Selected Mode

Program Analysis and Extraction

LLM Guided Mocking

Unit Test

④ AutoAssert[1]

i. Generate test

ii. Trace test (twice)

iii. Compare return values

iv. Create assertions

⑤ Examples

```python
@pytest.fixture
def generate_query_notify():
    with open('.../query_notify.pkl', 'rb') as f:
        query_notify = dill.loads(f.read())
    return query_notify


@pytest.fixture
def generate_query_notify():
    clone_query_notify = QueryNotifyPrint.__new__()
    setattr(clone_query_notify, 'browse', False)
    setattr(clone_query_notify, 'print_all', False)
    setattr(clone_query_notify, 'result', None)
    setattr(clone_query_notify, 'verbose', False)
    return clone_query_notify


query_notify = QueryNotifyPrint \
    (result=None,
    verbose=args.verbose,
    print_all=args.print_all,
    browse=args.browse)
```

1. Zamprogno, L., Hall, B., Holmes, R., & Atlee, J. M. (2022). Dynamic human-in-the-loop assertion generation. *IEEE Transactions on Software Engineering, 49*(4), 2337-2351.