



BAHIR DAR UNIVERSITY

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Principles of Compiler Design

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ASSIGNMENT 3

Detect null dereferencing statically when possible.

Goal: Catch errors before running the program.

Approach

1. Track each variable as:
 - a. **NULL** → definitely null
 - b. **NON_NULL** → definitely not null
 - c. **UNKNOWN** → may or may not be null
2. Propagate this **nullness information** through the program.
3. If a variable is **proven NULL** and is dereferenced → report a **compile-time error**.

```
x = null; // x → NULL
```

```
x = new Object(); // x → NON_NULL
```

```
x = y; // x → same as y
```

Deference: x->field;

- If x = **NULL** → error
- If x = **NON_NULL** → safe
- If x = **UNKNOWN** → ignore

Example: c++ p = null;

```
q = p;
```

```
x = q->field;
```

```
p = NULL
```

q = p → NULL q->field → variable is NULL → error

