The Whacky World of Undefined Behaviour

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What is this Talk about?

Undefined behaviour! With a smack of LLVM.

We'll cover things like:

- What is undefined behaviour?
- What happens when you encounter UB?
- How is UB useful? Should we avoid it?
  - Optimizations?
- UB in LLVM (and indeterminate values)
- How this all fits into Vellvm

Not for anything in particular! It's just a fun topic, and hopefully talking about it will clarify some things for myself and you!

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Done.

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- Easy to conflate with things like implementation defined behaviour... Which is sort of different.
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  - Array out of bounds in Python? Exception, not UB.
  - Array out of bounds in C? ... Pray.

What happens when you encounter UB?

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Yes.

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Yes. Anything.

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Compiler will do whatever it finds easiest or most efficient.

- noop, and then continue
- halt
- halt **and** catch fire
- erase the hard drive

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  - So far I'm pretty sure this is just a joke, but I wouldn't rule it out.

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    - Static checks can eliminate some dynamic checks
    - Bounds checking still common.

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Instead, why not...

Do nothing?

Why is this useful?

UB may seem somewhat unprincipled, but it has advantages:

- Gives compiler an axiom.
- Puts burden on programmer, or other tools

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After all, who wants to do 2 extra additions?

But this is sort of wrong...

```
1 + INT_MAX < 1 + 3
// This evaluates to
INT_MIN < 4 == True

// But...
INT_MAX < 3 == False
```

References

In: ().

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These are all good resources! You should look at them!