

A dramatic night photograph of a lightning strike over a city skyline. The sky is dark with some light clouds. A bright, multi-pronged lightning bolt strikes the ground, illuminating the area around it. In the background, the city lights are visible, including a prominent red tower on the left. The overall scene is dark and atmospheric.

# Section 2 – CSE341

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# Type Synonyms

What if I want to call `int * int * int`  
a `date`?

```
type date = int * int * int
```

# Type Synonyms

## type vs datatype

Datatype introduces a new type name,  
distinct from all existing types

```
datatype suit = Club | Diamond | Heart | Spade
datatype rank =
    Jack | Queen | King | Ace | Num of int
```

**Type is just another name**

```
type card = suit * rank
```

# Type Synonym

Why?

For now, just for convenience.

It doesn't let us do anything new.

Later in the course we will see another use related to modularity.

# Type Generality

Write a function that appends two string lists...

# Type Generality

We expected

```
string list * string list -> string list
```

But the type checker says

```
`a list * `a list -> `a list
```

Why is this okay?

# Type Generality

The type 'a is **more general**

More general types “can be used” as any less general type.

# Type Generality

The “more general” rule

A type  $t1$  is more general than the type  $t2$  if you can take  $t1$ , replace its type variables consistently, and get  $t2$



# Equality Types

Write a contains function...

# Equality Types

Double quotes arise from use of the '=' operator

We can only use '=' on types that can be compared

Generality rules work the same, except substitution must be some type which can be compared with '='

# Syntactic Sugar

If-then-else is just a case statement in disguise...

# Syntactic Sugar

Pattern matching...