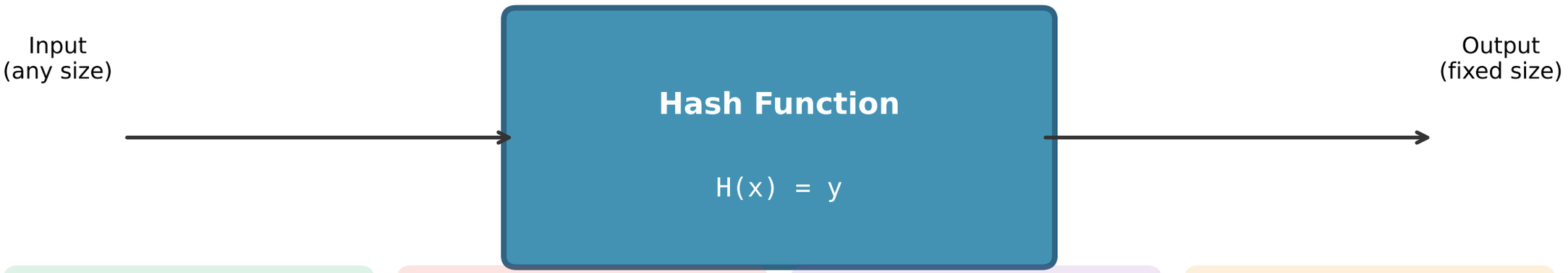
Cryptographic Hash Function Properties



Deterministic

Same input always produces same output

One-Way

Cannot reverse: H(x) -> x impossible

Collision Resistant

Hard to find x1, x2 where H(x1) = H(x2)

Avalanche Effect

Small input change = completely different output

SHA-256 Example:

```
"Hello" -> 185f8db32271fe25f561a6fc938b2e264306ec304eda518007d1764826381969
```

Source: NIST FIPS 180-4 (Secure Hash Standard)