CSE216
Programming Abstraction

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Today

- Capture avoiding substitution in beta reduction

- Extending lambda calculus core

Capture avoiding substitutions

- The specific names of bound variables in the lambda calculus are meaningless

- λ x. x same as λ y. y

- (λx.(λy.yx)) is equivalent to (λa.(λb.ba))

- Lambda terms that differ only by bound variable names are called alpha equivalent

Exercise: alpha equivalence?

- λ x. xy ? λ z. zy
- λ x. xy ? λ z. xz
- λ x. x λ y. y ? λ z. z λ p. p
- λ x. x λ y. y ? λ y. y λ y. y
- λ x. x λ y. x y ? λ y. y λ y. y y

Exercises: beta reduction

- (λ x.λ y. x)y

Exercises: beta reduction

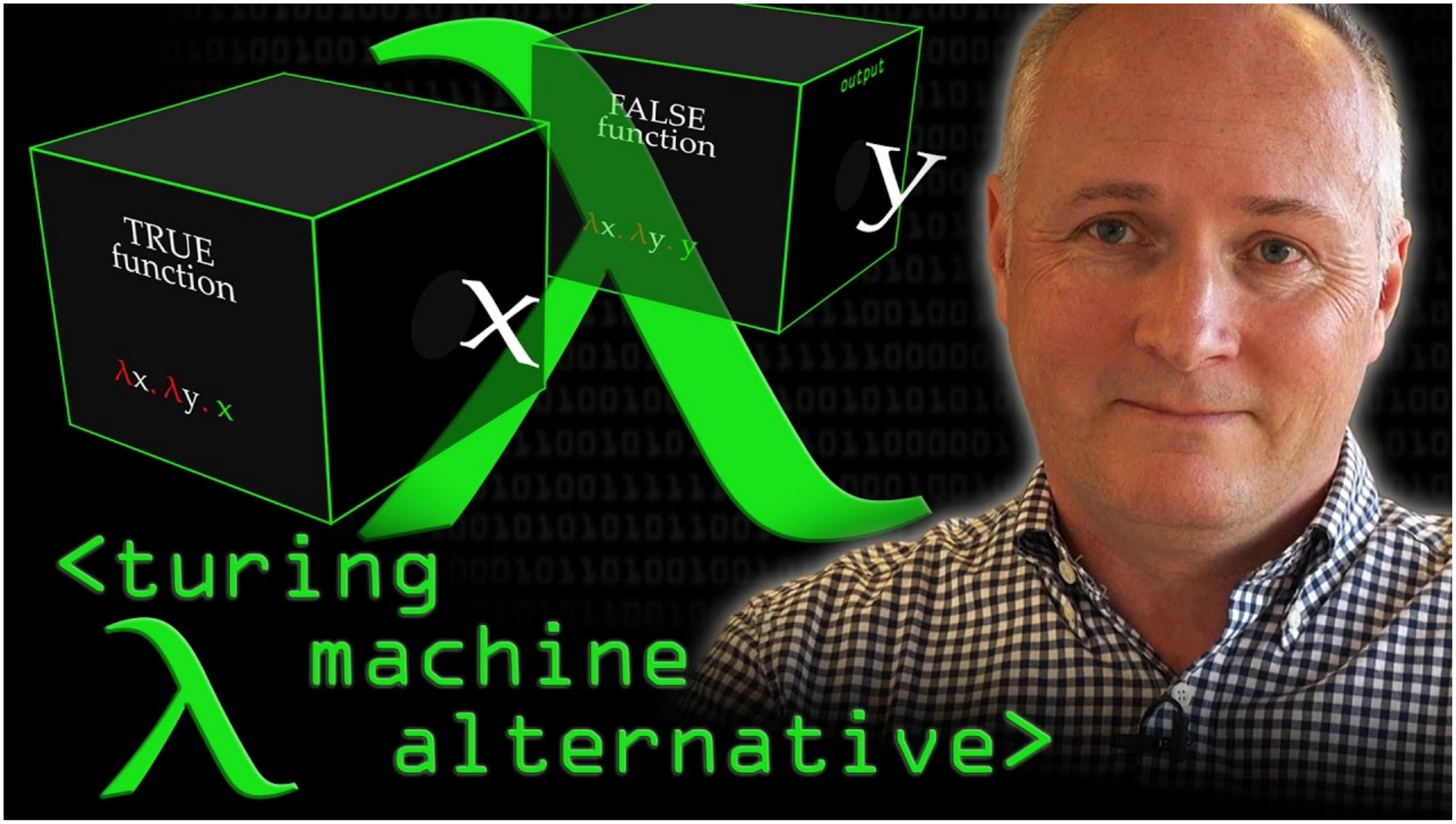
- (λ x. x λ y.x)y

Exercises: beta reduction

- (λ x.λ y. x y) y

Exercises: beta reduction

- $(\lambda x.\lambda y.xy)(\lambda x.\lambda y.xy)$



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