Software System Design and Implementation

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Add Wei Curtis Millar Powcoder

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- In classical logic more can be proven but less can be expressed.
- Intuitionistic proof of an existence statement gives a witness for the statement. Add Vechat powcoder

- Consider the statement $\exists x, y. (x \in \mathbb{I}) \land (y \in \mathbb{I}) \land (x^y \in \mathbb{Q})$.

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- Proof:

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- Consider the statement $\exists x, y.(x \in \mathbb{I}) \land (y \in \mathbb{I}) \land (x^y \in \mathbb{Q})$.
- Proof: Consident to Ser / 2 p. owcoder.com

 - o Other Add We Chat powcoder

- Let $\mathbb O$ be the set of rational numbers and $\mathbb I$ be the set of irrational numbers.
- Consider the statement $\exists x, y.(x \in \mathbb{I}) \land (y \in \mathbb{I}) \land (x^y \in \mathbb{Q})$.
- Proof:
 - Considert Deser 1/2 powcoder.com
 - - Pick $x = \sqrt{2}$ and $v = \sqrt{2}$
 - TA del We Chat powcoder

- ullet Let ${\mathbb Q}$ be the set of rational numbers and ${\mathbb I}$ be the set of irrational numbers.
- Consider the statement $\exists x, y. (x \in \mathbb{I}) \land (y \in \mathbb{I}) \land (x^y \in \mathbb{Q})$.
- Proof:
 - Considertions: 1/2 powcoder.com
 - - Pick $x = \sqrt{2}$ and $y = \sqrt{2}$
 - otherwise in 12 We Chat powcoder
 - Pick $x = \sqrt{2}^{\sqrt{2}}$ and $y = \sqrt{2}$
 - Then $x^y = (\sqrt{2}^{\sqrt{2}})^{\sqrt{2}} = \sqrt{2}^2 = 2 \text{ so } x^y \in \mathbb{Q}$

Recall: The Curry-Howard Isomorphism

This correspondence goes by many names, but is usually attributed to Haskell Curry and William Floward ment Project Exam Help

	Logic	Programming	
1.44	Propositions	Types	
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1	Proof Simplification	Evaluation	

Recall: The Curry-Howard Isomorphism

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http	S://®®WC	O Charles O	m
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It turns out, no matter what logic you want to define, there is always a corresponding λ -calculus, and Λ cevers.

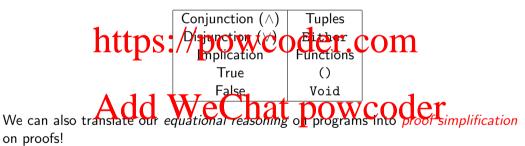
Constructive Logic
Classical Logic
Modal Logic
Linear Logic
Separation Logic

Continuations
Monads
Linear Types, Session Types
Region Types

on proofs!

Translating

Assignment Project Exam Help We can translate logical connectives to types and back:



Constructors and Eliminators for Sums

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 $\frac{\Gamma \vdash e :: A}{\Gamma \vdash () :: ()} \stackrel{\Gamma \vdash e :: A}{\leftarrow \Gamma \vdash \text{Left } e :: \text{Either } A B} S_L \qquad \frac{\Gamma \vdash e :: B}{\Gamma \vdash \text{Right } e :: \text{Either } A B} S_R$ $\frac{1}{\Gamma \vdash \text{Right } e :: \text{Either } A B} S_R$

Type Correctness

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Examples

```
prop_or_false :: a -> (Either a Void)
PropArsfsignment Project Exam Help
prop_or_true :: a -> (Either a ())
prop_or_true a = Right ()
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prop_and_true a = (a, ())
prop_double_Addo WeChatipowcoder
prop_double_neg_intro a f = f a
prop_triple_neg_elim ::
  (((a-> Void) -> Void) -> Void) -> a -> Void
prop_triple_neg_elim f a = f (\g -> g a)
```

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- If you enjoyed the course and want to do more in this direction, ask us for thesis topics, taste of research projects, and consider attending COMP \$161 and COMP \$161.

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- Fill in the myExperience reports, it is important for us to receive your feedback.

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- Make sure to join the dwyle or Homea Be pady to the regreen with REPL (ghci or stack repl) and editor set up.