

CISC 6828

Artificial Intelligence

Assignment Project Exam Help

<https://powcoder.com>

Add WeChat powcoder

Russell & Norvig, Chapter 3

Outline

- Why FOL?

- Syntax and Semantics of FOL

- Using FOL

- Various WeChat

- Knowledge Engineering

Assignment Project Exam Help

<https://powcoder.com>

Add WeChat powcoder

Last Week Propositional Logic

- Propositions; Syntax, Semantics

Assignment Project Exam Help

- Entailment: $\alpha \models \beta$ iff $M(\alpha) \subseteq M(\beta)$

- Model checking for Wumpus world

$KB \models g$ iff $M(KB) \subseteq M(g)$

- Inference: $\alpha \vdash_i \beta$ = sentence β can be derived from α (sound?, complete?)
- Resolution: show $KB \wedge \neg \alpha$ unsatisfiable
- Horn clauses; Back/Forward Chaining

Propositional Logic Pros & Cons

Advantages: declarative

Advantages: partial/disjunctive/negated information

Advantages: **Assignment Project Exam Help**

Advantages: compositional

Advantages: **<https://powcoder.com>**

Advantages: context-independent

Advantages: **Add WeChat powcoder**

Disadvantages: very limited expressive power

Disadvantages: undecidable

Disadvantages: cannot express any form of recursion

Disadvantages: cannot express any form of quantification

First 10 of 100 | 6

contains **facts**

Assignment Project Exam Help

<https://powcoder.com>

– Objects

Add WeChat powcoder

– Relations

– Functions

Syntax of FOL Basic elements

- Constants King, John, 2, NUS, ...
- Predicates Brother, >, ...
- Functions Sqrt, LeftLegOf, ...
- Variables x, y, a, b, \dots
- Connectives $\neg, \Rightarrow, \wedge, \vee, \Leftrightarrow$
- Equality $=$
- Quantifiers \forall, \exists

Assignment Project Exam Help

<https://powcoder.com>

Add WeChat powcoder

Atomic sentences

Atomic sentence = *predicate* (*term*₁,...,*term*_{*n*})
*term*₁ = *term*₂

Assignment Project Exam Help

Term = *function* (*term*₁,...,*term*_{*n*})
<https://powcoder.com>

Add WeChat powcoder

Brother(*LeftLegOf* (*Person* *John*))

> (*Length*(*LeftLegOf* (*Person* *John*))
 Length(*LeftLegOf* (*Person* *John*)))

Complex solutions

Complex solutions are made from algebraic
expressions using integers

Assignment Project Exam Help

<https://powcoder.com>

Add WeChat powcoder

Software Engineer, Longford

Truth in First-Order Logic

model interpretation

Assignment Project Exam Help

<https://powcoder.com>

constant symbols
predicate symbols
function symbols

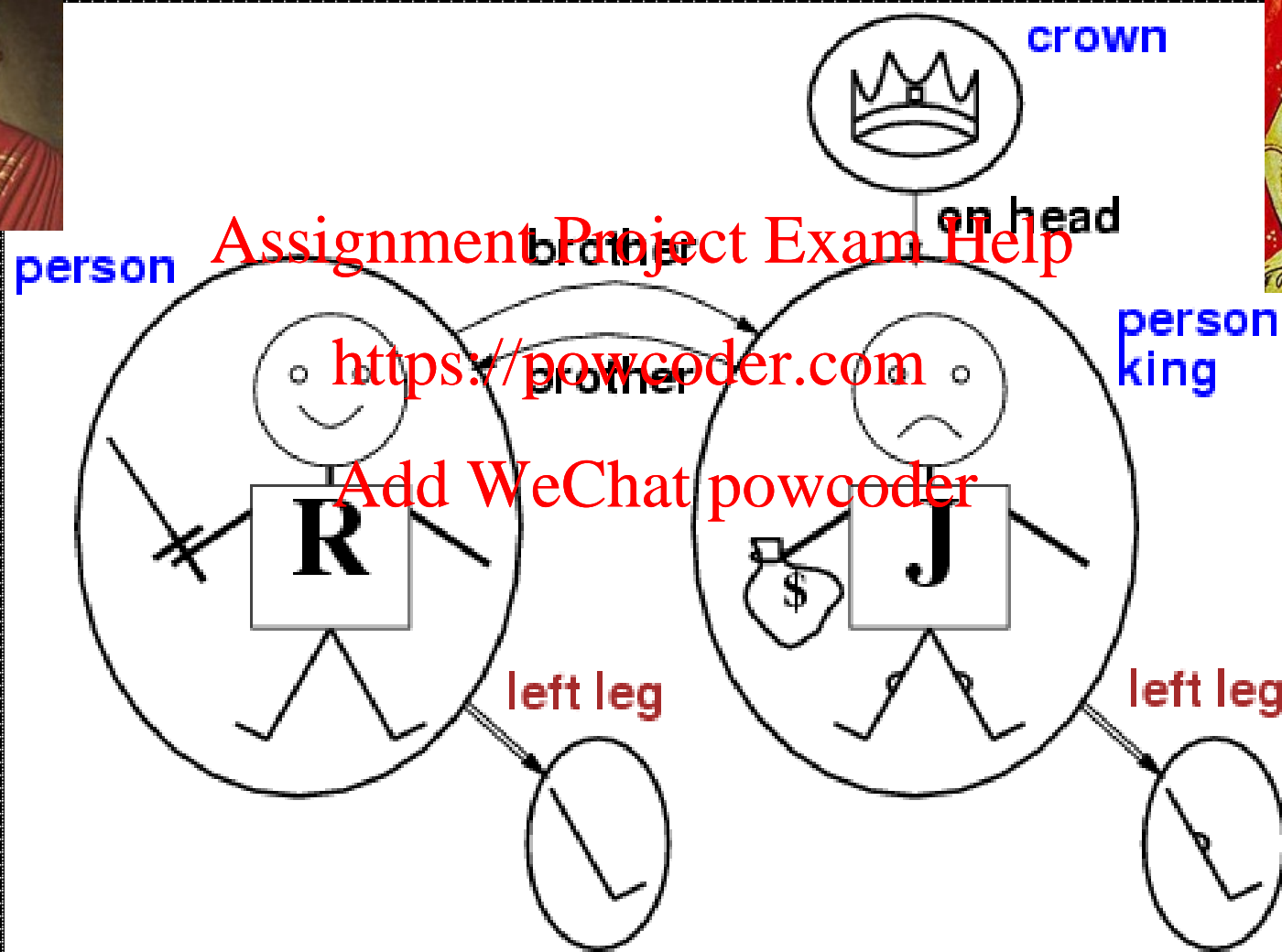
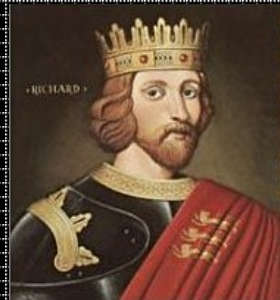
Add WeChat powcoder

objects
relations
functional relations

objects

relation

Models for FOL - Example



Universal quantification

Everyone at Fordham is smart

Everyone at Fordham is smart

Assignment Project Exam Help

<https://powcoder.com>

Add WeChat powcoder

conjunction of instantiations

\wedge At(KingJohn, Fordham) \Rightarrow Smart(KingJohn)
 \wedge At(Richard, Fordham) \Rightarrow Smart(Richard)
 \wedge At(Fordham, Fordham) \Rightarrow Smart(Fordham)
 $\wedge \dots$

A common mistake to avoid

- ✗ Avoiding plagiarism by copying and pasting

Assignment Project Exam Help

- ✗ Copying and pasting <https://powcoder.com>

connecting with you

Add WeChat powcoder

wechat: powcoder (qq: 235517103)

means "Everyone get to know me and everyone is my friend"

Existential Quantification

✓ ~~Formal Logic~~ ~~Formal Logic~~

✓ ~~Formal Logic~~ ~~Formal Logic~~

✓ ~~Formal Logic~~ **Assignment Project Exam Help**

✓ ~~Formal Logic~~ **<https://powcoder.com>** ~~Formal Logic~~

✓ ~~Formal Logic~~ **Add WeChat powcoder** ~~Formal Logic~~ **disjunction**
instantiations of

$\text{At}(\text{KingJohn}, \text{Fordham}) \wedge \text{Smart}(\text{KingJohn})$
 $\vee \text{At}(\text{Richard}, \text{Fordham}) \wedge \text{Smart}(\text{Richard})$
 $\vee \text{At}(\text{Fordham}, \text{Fordham}) \wedge \text{Smart}(\text{Fordham})$
 $\vee \dots$

Another common mistake to AVOID

Assignment Project Exam Help

<https://powcoder.com>

Add WeChat powcoder

Full Stack JavaScript — Sanjivkumar

Properties of Quantifiers

$\forall \forall x \forall y$ is the same as $\forall y \forall x$

$\forall \exists x \exists y$ is the same as $\exists y \exists x$

Assignment Project Exam Help

$\forall \exists x \forall y$ is **not** the same as $\forall y \exists x$

$\forall \exists x \forall y \text{ Loves}(x, y)$
<https://powcoder.com>

– “There is a person who loves everyone in the world”

$\forall \forall y \exists x \text{ Loves}(x, y)$
Add WeChat powcoder

– “Everyone in the world is loved by at least one person”

- Quantifier duality is one of the basic rules of logic

$\forall x \text{ Likes}(x, \text{IceCream})$

$\exists x \text{ Likes}(x, \text{Broccoli})$

$\neg \exists x \neg \text{Likes}(x, \text{IceCream})$

$\neg \forall x \neg \text{Likes}(x, \text{Broccoli})$

图 1 上、下板

Assignment Project Exam Help

<https://powcoder.com>

Add WeChat powcoder

國際經濟學博士班

USING POW

The Kinds of Codes

* Servers are all kinds

Assignment Project Exam Help

<https://powcoder.com>

* Client and Server are all kinds

Add WeChat powcoder

* Setting a system

For all kinds of things

USING POW

1. Create an account

2. We can use the following link to create an account

3. Click on the link

4. We can use the link <https://powcoder.com>

5. We can use the link to create an account

6. We can use the link to create an account

7. We can use the link to create an account

8. We can use the link to create an account

9. We can use the link to create an account

Interacting with FOL KBs

Example: Representing the world of the blocks world in FOL

```
Tell( KB, Percept([Smell,Breeze,None],5) )
```

```
Ask( KB,  $\exists a$  BestAction(a,5) )
```

Assignment Project Exam Help

Example: Representing the world of the blocks world in FOL

<https://powcoder.com>

substitution

Add WeChat powcoder

Example: Representing the world of the blocks world in FOL

Example: Representing the world of the blocks world in FOL

$S = \text{Smarter}(x,y)$

$\sigma = \{x/\text{Hillary}, y/\text{Bill}\}$

$S\sigma = \text{Smarter}(\text{Hillary}, \text{Bill})$

Example: Representing the world of the blocks world in FOL

Knowledge base for the various work

- Perception

Types of Perception [s,b,Glitter]
Assignment Project Exam Help

- Reflex

<https://powcoder.com>

Types of Reflex Add WeChat powCoder

Deducing hidden properties

$\forall x \neg \text{Adjacency}(x,y) \wedge \text{Adjacency}(x,z) \Rightarrow$
 $\text{Adjacent}(y,z) \wedge \forall x (\text{Adjacent}(x,y) \Rightarrow \text{Adjacent}(x,z))$

Assignment Project Exam Help

<https://powcoder.com>

Add WeChat powcoder

— **Diagnostic** rule---infer cause from effect

$\forall s \text{ Breezy}(s) \Rightarrow \exists r \text{ Adjacent}(r,s) \wedge \text{Pit}(r)$

— **Causal** rule---infer effect from cause

$\forall r \text{ Pit}(r) \Rightarrow [\forall s \text{ Adjacent}(r,s) \Rightarrow \text{Breezy}(s)]$

Know your coding tool

1. Access the tool

2. Assign the appropriate knowledge

3. **Assignment Project Exam Help**

4. Basic IDE configuration

5. **<https://powcoder.com>**

6. **Add WeChat powcoder**

7. Add details to the selected codebase and get answers

8. Debug the knowledge base

Summary

• **PROVIDING POWER**

• **PROJECT POWER** – a new, more powerful, more efficient way to

Assignment Project Exam Help

• **SYNCHRONOUS POWER** – a new, more powerful, more efficient way to

• **equally** – a new, more powerful, more efficient way to

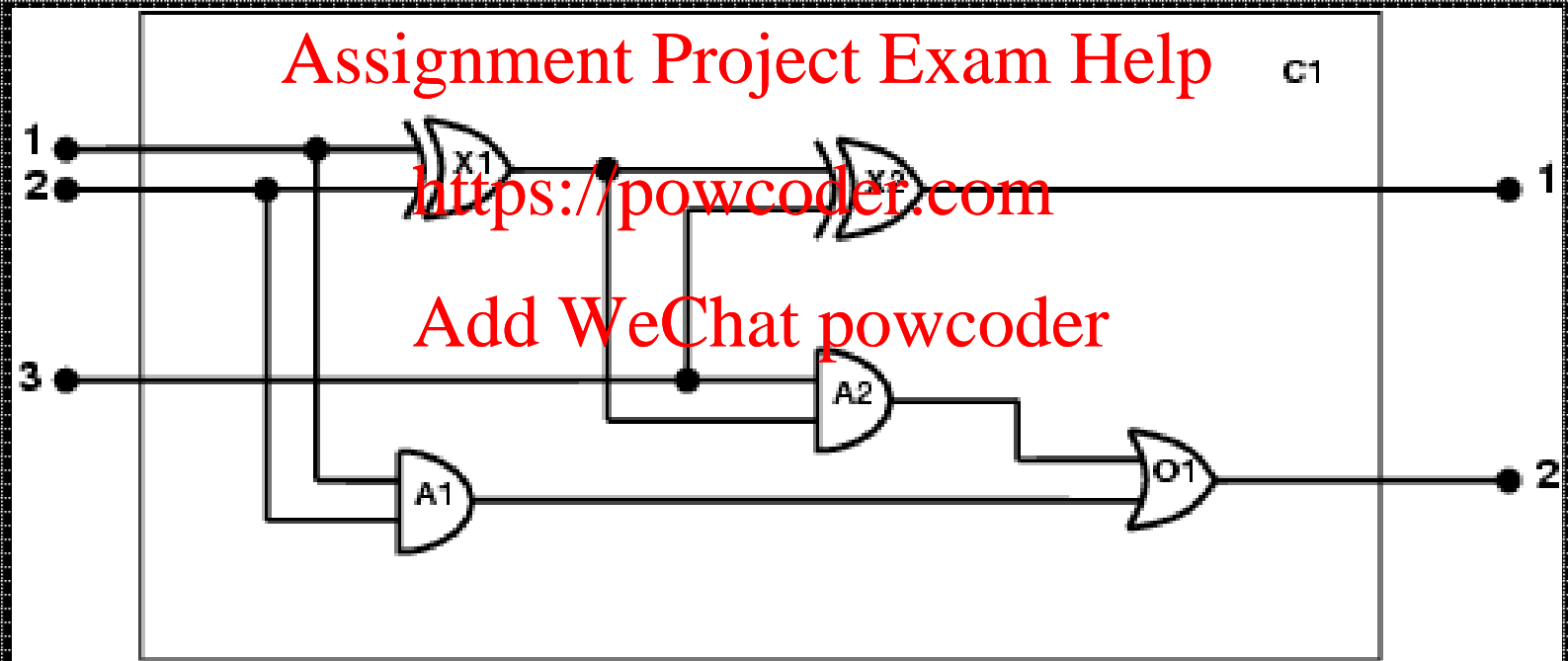
Add WeChat powcoder

• **increased expensive power** – a new, more powerful, more efficient way to

define Windows world

The electronic circuits domain

One-bit full adder



[illegible][illegible]

Assignment Project Exam Help

Assignment Project Exam 1

<https://powcoder.com>

Add WeChat powcoder

Bleeding Disorders

姓名： 学号： 班级： 日期： 第 页

三、非 自 然 的 理 想

THE UNIVERSITY OF CHICAGO

林林总总

The Electronic Circuits domain

Before getting knowledge of this domain

We should know the following things

Assignment Project Exam Help

<https://powcoder.com>

Add WeChat powcoder

The Electronic Circuits domain

8. Provide the specific problem based on

Speedy = XOR

Speedy = XOR

Speedy =

Assignment Project Exam Help

Speedy =

<https://powcoder.com>

Can be used for

Can be used for

Can be used for

Add WeChat powcoder

Can be used for

Can be used for

Can be used for

Can be used for

Can be used for

Can be used for

Can be used for

Can be used for

Can be used for

The electronic circuits domain

6. Please refer to the reference procedure

What are the steps to be followed?

Assignment Project Exam Help

<https://powcoder.com>

Add WeChat powcoder

Signal Processing

7. Please refer to the reference procedure

What are the steps to be followed?

Summary

• Financial Crisis 2008

• Project Finance: A New Paradigm for Infrastructure Development

Assignment Project Exam Help

• Systematic Risk: A Measure of the Degree to Which an Asset's Returns

Equal to the Market's Returns

Add WeChat powcoder

• Increased expensive power generation to

define Wuppertal World