

6	9	13	7
12		10	5
3	1	4	14
15	8	11	2

Mathematics for Computer Science
MIT 6.042J/18.062J

Predicate Logic, III

$\forall \exists$ in English



Albert R Meyer, February 17, 2012

lec 2F.1

6	9	13	7
12		10	5
3	1	4	14
15	8	11	2

Math vs. English

Poet:

"All that $\overbrace{\text{glitters}}^G$ is not $\overbrace{\text{gold}}^{Au}$."

~~$\forall x. [G(x) \text{ IMPLIES NOT}(Au(x))]$~~

No: gold glitters like gold!



Albert R Meyer, February 17, 2012

lec 2F.2

6	9	13	7
12		10	5
3	1	4	14
15	8	11	2

Math vs. English

Poet:

"All that glitters is necessarily not gold."

$\text{NOT}(\forall x. [G(x) \text{ IMPLIES } Au(x)])$

(Poetic license)



Albert R Meyer, February 17, 2012

lec 2F.3

6	9	13	7
12		10	5
3	1	4	14
15	8	11	2

Math vs. English

Poet: "There is a season to every purpose under heaven"

$\exists s \in \text{Season} \forall p \in \text{Purpose. } s \text{ is for } p$

Some season, say Summer, is good for all Purposes?

NO, Summer no good for snow shoveling



Albert R Meyer, February 17, 2012

lec 2F.4

6	9	13	7
12		10	5
3	1	4	14
15	8	11	2

Math vs. English

Poet: "There is a season to every purpose under heaven"

$\exists s \in \text{Season} \forall p \in \text{Purpose}. s \text{ is for } p$



Poet's meaning flips the quantifiers



6	9	13	7
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Math vs. English

Poet: "There is a season to every purpose under heaven"

$\forall p \in \text{Purpose} \exists s \in \text{Season}. s \text{ is for } p$

Poet's meaning flips the quantifiers



6	9	13	7
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Math vs. English

Poet: "There is a season to every purpose under heaven"

$\forall p \in \text{Purpose} \exists s \in \text{Season}. s \text{ is for } p$

for snow shoveling, Winter is good
 for planting, Spring is good
 for leaf watching, Fall is good

