The following problems are from Liu, Murray, and Pease's *Language, Proof, and Logic, 2nd Edition* as assigned by Dr. Pruss here. They are only those that can be completed without the accompanying software.

1 Atomic Sentences

Problem 10. *Translate the following into natural sounding, colloquial English, consulting the reference table above.*

1. `Owned(max, scruffy, 2:00)`
2. `Fed(max, scruffy, 2:30)`
3. `Gave(max, scruffy, claire, 3:00)`
4. `2:00 < 2:00`

The statements in FOL can be translated to plain English as:

1. Max owned Scruffy at 2:00.
2. Max fed Scruffy at 2:30.
3. Max gave Scruffy to Claire at 3:00.
4. 2:00 is earlier than 2:00.

Problem 13. *Assume that we have expanded the blocks language to include the function symbols* `fm`, `bm`, `lm`, *and* `rm` *described earlier. Then the following sentences would all be sentences of the language:*

1. `Tet(lm(e))`
2. `fm(c)=c`
3. `bm(b)=bm(e)`
4. `FrontOf(fm(e), e)`
5. `LeftOf(fm(b), b)`
6. `SameRow(rm(c), c)`
7. `bm(lm(c))=lm(bm(c))`
8. `SameShape(lm(b), bm(rm(e)))`
9. `d=lm(fm(rm(bm(d))))`
10. `Between(b, lm(b), rm(b))`

Fill in the following table with True*'s and* False*'s according to whether the indicated sentence is true or false in the indicated world (table omitted).*

	FOL	Leibniz's	Wittgenstein's
1.	`Tet(lm(e))`	True	False
2.	`fm(c)=c`	True	True
3.	`bm(b)=bm(e)`	True	True
4.	`FrontOf(fm(e), e)`	False	True
5.	`LeftOf(fm(b), b)`	False	False
6.	`SameRow(rm(c), c)`	True	True
7.	`bm(lm(c))=lm(bm(c))`	True	True
8.	`SameShape(lm(b), bm(rm(e)))`	True	True
9.	`d=lm(fm(rm(bm(d))))`	True	False
10.	`Between(b, lm(b), rm(b))`	True	True