Symbolizations with multi-place predicates (Unit 5: Sections 5.6-5.9)

Symbolize each of the following sentences using the abbreviation scheme provided

A^1: *a* is an animal.	B^1: *a* is a mouse.	C^1: *a* is cat.
D^1: *a* is a dog.	F^2: *a* is afraid of *b*.	G^2: *a* chases *b*.
a: Astro	b: Bandit	

S5.74 All dogs chase cats.

$\forall x(Dx \rightarrow \exists y(Cy \wedge G(xy)))$ (All dogs chase at least one cat.)

S5.75 All mice are chased by animals.

$\forall x(Bx \rightarrow \exists y(Ay \wedge G(yx)))$ (All mice are chased by at least one animal.)

S5.76 Some cats are chased by dogs.

$\exists x(Cx \wedge \exists y(Dy \wedge G(yx)))$ (At least one cat is chased by at least one dog.)

S5.77 No dog chases all cats.

$\sim\exists x(Dx \wedge \forall y(Cy \rightarrow G(xy)))$ (There is no dog that chases all cats.)

$\forall x(Dx \rightarrow \exists x(Cx \wedge \sim G(xy)))$ (Every dog has at least one cat it doesn't chase.)

S5.78 Some dogs do not chase any cats.

$\exists x(Dx \wedge \forall y(Cy \rightarrow \sim G(xy)))$ (There is some dog that fails to chase all cats.)

$\exists x(Dx \wedge \sim\exists y(Cy \wedge G(xy)))$ (There is some dog such that there's no cat that it chases.)

S5.79 Some dogs do not chase some cats.

$\exists x(Dx \wedge \exists y(Cy \wedge \sim G(xy)))$

(There is at least one dog such that there is at least one cat that it doesn't chase.)

S5.80 Some cats chase mice, but not all mice are chased by cats.

$\exists x(Cx \wedge \exists y(By \wedge G(xy))) \wedge \sim\forall x(Bx \rightarrow \exists y(Cy \wedge G(yx)))$

S5.81 All cats and dogs chase mice.

$\forall x(Cx \vee Dx \rightarrow \exists y(By \wedge G(xy)))$

S5.82 Some dogs chase cats and mice.

$\exists x(Dx \wedge \exists y(Cy \wedge G(xy)) \wedge \exists z(Bz \wedge G(xz)))$

S5.83 Mice are afraid of cats and dogs.

$\forall x(Bx \rightarrow \forall y(Cy \vee Dy \rightarrow F(xy)))$ OR

$\forall x(Bx \rightarrow \forall y(Cy \rightarrow F(xy))) \wedge \forall x(Bx \rightarrow \forall y(Dy \rightarrow F(xy)))$

S5.84 Although Astro is a dog, he doesn't chase cats or mice.

$Da \wedge \forall x(Cx \vee Bx \rightarrow \sim G(ax))$ OR $Da \wedge \sim\exists x((Cx \vee Bx) \wedge \sim G(ax))$

S5.85 No dog that chases Bandit is afraid of cats that chase dogs.

$\sim\exists x(Dx \wedge G(xb) \wedge \forall y(Cy \wedge \exists z(Dz \wedge G(yz)) \rightarrow F(xy)))$

S5.86 Any animal that Bandit chases is afraid of her.

$\forall x(Ax \wedge G(bx) \rightarrow F(xb))$

S5.87 Any dog that chases mice chases cats.

$\forall x(Dx \wedge \exists y(By \wedge G(xy)) \rightarrow \exists z(Cz \wedge G(xz)))$

S5.88 Not all animals that chase cats are dogs.

$\exists x(Ax \wedge \exists y(Cy \wedge G(xy)) \wedge \sim Dx)$ OR $\sim\forall x(Ax \wedge \exists y(Cy \wedge G(xy)) \rightarrow Dx)$

S5.89 Some dogs chase cats that chase mice.

$\exists x(Dx \wedge \exists y(Cy \wedge \exists z(Bz \wedge G(yz)) \wedge G(xy)))$

S5.90 Mice are afraid of cats that chase them.

$\forall x(Bx \rightarrow \forall y(Cy \wedge G(yx) \rightarrow F(xy)))$

S5.91 Mice, which are afraid of cats, get chased by them.

$\forall x(Bx \rightarrow \forall y(Cy \rightarrow F(xy))) \wedge \forall x(Bx \rightarrow \exists y(Cy \wedge G(yx)))$

S5.92 Some cats are chased by dogs that don't chase mice.

$\exists x(Cx \wedge \exists y(Dy \wedge \sim\exists z(Bz \wedge G(xz)) \wedge G(yx)))$

S5.93 Dogs and cats are animals that chase things.

$\forall x(Dx \vee Cx \rightarrow Ax \wedge \exists yG(xy))$

S5.94 Astro chases those and only those cats that don't chase Astro.

$\forall x(Cx \rightarrow (\sim G(xa) \leftrightarrow G(ax)))$

S5.95 Any cat is afraid of a dog that chases it.

$\forall x(Cx \rightarrow \forall y(Dy \wedge G(yx) \rightarrow F(xy)))$

S5.96 Bandit isn't afraid of dogs unless they chase her.

$\forall x(Dx \rightarrow \sim F(bx) \vee G(xb))$ OR $\forall x(Dx \rightarrow (F(bx) \rightarrow G(xb)))$

S5.97 Some cats are not afraid of dogs unless the dogs chase them.

$\exists z(Cz \wedge \forall x(Dx \rightarrow \sim F(zx) \vee G(xz)))$ OR $\exists z(Cz \wedge \forall x(Dx \rightarrow (F(zx) \rightarrow G(xz))))$

S5.98 No dog is afraid of a cat unless the cat chases them.

$\sim\exists x(Dx \wedge \exists y(Cy \wedge F(xy) \wedge \sim G(yx)))$ or $\forall x(Dx \rightarrow \forall y(Cy \rightarrow (\sim G(yx) \rightarrow \sim F(xy))))$

S5.99 Dogs that are afraid of cats don't chase any animals at all.

$\forall x(Dx \wedge \forall y(Cy \rightarrow F(xy)) \rightarrow \sim\exists z(Az \wedge G(xz)))$

S5.100 Bandit chases only those dogs that chase the mice that Bandit chases.
$\forall x(Dx \wedge G(bx) \rightarrow \exists y(By \wedge G(by) \wedge G(xy)))$

Symbolize each of the following sentences using the abbreviation scheme provided

A^1: *a* is an author. B^1: *a* is a book. C^1: *a* is a magazine.
F^1: *a* is a person. G^1: *a* is a time. H^2: *a* writes *b*.
I^2: *a* is about *b*. L^2: *a* likes *b*. M^3: *a* reads *b* at *c*

S5.101 Nobody likes everyone.

$\sim\exists x(Fx \wedge \forall y(Fy \rightarrow L(xy)))$ OR $\forall x(Fx \rightarrow \exists y(Fy \wedge \sim L(xy)))$

S5.102 Someone likes everyone. (Ambiguous – symbolize two different ways.)

$\forall x\, (Fx \rightarrow \exists y\, (Fy \wedge L(yx)))$ Everyone has somebody that likes them.
$\exists x\, (Fx \wedge \forall y\, (Fy \rightarrow L(xy)))$ There is a person who likes everyone.

S5.103 Everybody likes somebody. (Ambiguous – symbolize two different ways.)

$\forall x\, (Fx \rightarrow \exists y\, (Fy \wedge L(xy)))$ Everyone has somebody that they like.

$\exists x\, (Fx \wedge \forall y\, (Fy \rightarrow L(yx)))$ There is a person whom everyone likes.

S5.104 Nobody is liked by everyone.

$\sim\exists x(Fx \wedge \forall y(Fy \rightarrow L(yx)))$ OR $\forall x(Fx \rightarrow \exists y(Fy \wedge \sim L(yx)))$

S5.105 Everybody likes those who like them.

$\forall x(Fx \rightarrow \forall y(Fy \wedge L(yx) \rightarrow L(xy)))$

S5.106 Some people like only those who like them.

$\exists x(Fx \wedge \forall y(Fy \wedge L(xy) \rightarrow L(yx)))$

S5.107 Nobody who likes only those who like them likes people who like nobody.

$\sim\exists x(Fx \wedge \forall y(Fy \wedge L(xy) \rightarrow L(yx)) \wedge \exists z(Fz \wedge L(xz) \wedge \forall w(Fw \rightarrow \sim L(zw))))$

S5.108 Authors are people who write books.

$\forall x(Ax \rightarrow Fx \wedge \exists y(By \wedge H(xy)))$

S5.109 People who write books like at least some books.

$\forall x(Fx \wedge \exists y(By \wedge H(xy)) \rightarrow \exists z(Bz \wedge L(xz)))$

S5.110 People who like exactly the same books as each other like the same magazines too.

$\forall x\forall y(Fx \wedge Fy \wedge \forall z(Bz \rightarrow (L(xz) \leftrightarrow L(yz))) \rightarrow \forall z(Cz \rightarrow (L(xz) \leftrightarrow L(yz)))$

S5.111 Some people write books that are about people who write books.

$\exists x(Fx \wedge \exists y(By \wedge H(xy) \wedge \exists z(Fz \wedge \exists w(Bw \wedge H(zw)) \wedge I(yz))))$

S5.112 Any authors who only write books about things that they like, also like things that they don't write books about.

$\forall x(Ax \wedge \forall y\forall z(Bz \wedge H(xz) \wedge I(zy) \rightarrow L(xy)) \rightarrow \exists y(L(xy) \wedge \sim\exists z(Bz \wedge H(xz) \wedge I(zy))))$

S5.113 All books are read by someone or another at some time or another.

$\forall x(Bx \rightarrow \exists y(Fy \wedge \exists z(Gz \wedge M(yxz))))$

S5.114 Everybody who writes books reads books.

$\forall x(Fx \wedge \exists y(By \wedge H(xy)) \rightarrow \exists z(Bz \wedge \exists w(Gw \wedge M(xzw))))$

S5.115 Those people who never read books don't write books.

$\forall x(Fx \rightarrow (\forall y(Gy \rightarrow \forall z(Bz \rightarrow \sim M(xzy))) \rightarrow \forall y(By \rightarrow \sim H(xy)))$

OR $\forall x(Fx \wedge \sim\exists y(Gy \wedge \exists z(Bz \wedge M(xzy))) \rightarrow \sim\exists y(By \wedge H(xy))$

S5.116 People who only ever read magazines don't like books.

$\forall x(Fx \wedge \forall y(Gy \rightarrow \forall z(M(xzy) \rightarrow Cz)) \rightarrow \forall w(Bw \rightarrow \sim L(xw)))$

OR $\forall x(Fx \wedge \sim\exists y\exists z(Gy \wedge \sim Cz \wedge M(xzy)) \rightarrow \sim\exists w(Bw \wedge L(xw)))$

S5.117 Only people who have never read magazines like everything that they have ever read.

$\forall x(Fx \wedge \forall y\forall z(Gz \wedge M(xyz) \rightarrow L(xy)) \rightarrow \sim\exists y(Gy \wedge \exists z(Cz \wedge M(xzy))))$

OR $\forall x(Fx \wedge \forall y(\exists z(Gz \wedge M(xzy)) \rightarrow L(xz)) \rightarrow \sim\exists y(Gy \wedge \exists z(Cz \wedge M(xzy))))$

S5.118 Some authors don't ever read magazines, but every magazine gets read by some author.

$\exists x(Ax \wedge \sim\exists y(Gy \wedge \exists z(Cz \wedge M(xzy)))) \wedge \forall x(Cx \rightarrow \exists y(Ay \wedge \exists z(Gz \wedge M(yxz))))$

OR $\exists x(Ax \wedge \sim\exists y(Cy \wedge \exists z(Gz \wedge M(xyz)))) \wedge \forall x(Cx \rightarrow \exists y(Gy \wedge \exists z(Az \wedge M(zxy))))$

S5.119 Anybody who likes every book that he/she ever reads doesn't ever read books about things that he/she doesn't like.

$\forall x(Fx \wedge \forall y(By \wedge \exists z(Gz \wedge M(xyz)) \rightarrow L(xy)) \rightarrow \sim\exists y(Gy \wedge \exists z(Bz \wedge \exists w(I(zw) \wedge \sim L(xw) \wedge M(xzy)))))$

S5.120 Not all authors write books about things that they have read books about.

$\sim\forall x(Ax \rightarrow \exists y(By \wedge H(xy) \wedge \exists z(I(yz) \wedge \exists w(Bw \wedge I(wy) \wedge \exists v(Gv \wedge M(xwv))))))$

S5.121 Nobody who reads books likes all the books he/she has ever read.

$\sim\exists x(Fx \wedge \exists y(By \wedge \exists z(Gz \wedge M(xyz))) \wedge \forall y(By \wedge \exists z(Gz \wedge M(xyz)) \rightarrow L(xy)))$

S5.122 Only authors like all the books that they have ever read.

$\forall x(Fx \wedge \forall y(By \wedge \exists z(Gz \wedge M(xyz)) \rightarrow L(xy))) \rightarrow Ax)$

S5.123 Although all books are read by people sooner or later, not all books are ever read by the same person.

$\forall x(Bx \rightarrow \exists y(Fy \wedge \exists z(Gz \wedge M(yxz)))) \wedge \sim\exists x(Fx \wedge \forall y(By \rightarrow \exists z(Gz \wedge M(xyz))))$

S5.124 Not everyone reads the same book at the same time.

$\sim\exists x(Bx \wedge \exists y(Gy \wedge \forall z(Fz \rightarrow M(zxy))))$

S5.125 Someone is always reading a book. (Ambiguous – symbolize 4 diff. ways.)

$\exists x(Fx \wedge \exists y(By \wedge \forall z(Gz \rightarrow M(xyz))))$ The same person is always reading the same book.
$\exists y(By \wedge \exists x(Fx \wedge \forall z(Gz \rightarrow M(xyz))))$ The same person is always reading the same book.

$\exists x(Fx \wedge \forall z(Gz \rightarrow \exists y(By \wedge M(xyz))))$ The same person is always reading some book or another.

$\exists y(By \wedge \forall z(Gz \rightarrow \exists x(Fx \wedge M(xyz))))$ The same book is always being read by someone or another.

$\forall z(Gz \rightarrow \exists x(Fx \wedge \exists y(By \wedge M(xyz))))$ At all times, (different) people are reading (different) books.
$\forall z(Gz \rightarrow \exists y(By \wedge \exists x(Fx \wedge M(xyz))))$ At all times, (different) people are reading (different) books.

Symbolize each of the following sentences using the abbreviation scheme provided

A^1: *a* is a restaurant.	B^1: *a* is a business.	C^1: *a* is a store.
D^1: *a* is a day.	F^1: *a* is a food.	H^1: *a* is a person.
J^2: *a* is more expensive than *b*.	K^2: *a* shops at *b*.	L^3: *a* eats at *b* on *c*.
M^3: *a* buys *b* from *c*. (Or *c* sells *b* to *a*.)	a: Honest Ed's	b: Holt Renfrew

S5.126 Some stores are more expensive than any restaurant.

$\exists x(Cx \wedge \forall y(Ay \rightarrow J(xy)))$

S5.127 Some people only buy things from stores that are more expensive than Honest Ed's.

$\exists x(Hx \wedge \forall y(Cy \wedge \exists zM(xzy) \rightarrow J(ya)))$ or $\exists x(Hx \wedge \forall y(Cy \rightarrow (\exists zM(xzy) \rightarrow J(ya))))$

$\exists x(Hx \wedge \forall y\forall z(Cy \wedge M(xzy) \rightarrow J(ya)))$ or $\exists x(Hx \wedge \forall y\forall z(Cy \rightarrow (M(xzy) \rightarrow J(ya))))$

S5.128 Nothing people buy at Honest Ed's is more expensive than anything people buy at Holt Renfrew.

$\sim\exists x\exists y(Hy \wedge M(yxa) \wedge \exists z\exists w(Hz \wedge M(zwb) \wedge J(xw)))$

$\forall x\forall y(Hy \wedge M(yxa) \rightarrow \sim\exists z\exists w(Hz \wedge M(zwb) \wedge J(xw)))$

$\forall x\forall y(Hy \wedge M(yxa) \rightarrow \forall z\forall w(Hz \wedge M(zwb) \rightarrow \sim J(xw)))$

S5.129 Stores and restaurants are businesses that sell things to people.

$\forall x(Cx \vee Ax \rightarrow \exists y\exists z(Hz \wedge M(zyx)))$ (Description of stores and restaurants.)

or $\forall x\exists y\exists z (Cx \vee Ax \rightarrow (Hz \wedge M(zyx)))$

$\forall x(Cx \vee Ax \leftrightarrow \exists y\exists z(Hz \wedge M(zyx)))$ (Definition of stores and restaurants.)

S5.130 Some days nobody eats at some restaurants.

$\exists x(Dx \wedge \exists y(Ay \wedge \sim\exists z(Hz \wedge L(zyx)))$

$\exists x(Dx \wedge \exists y(Ay \wedge \forall z(Hz \rightarrow \sim L(zyx)))$

S5.131 For a business to be a store, it is necessary that people shop there.

$\forall x(Bx \rightarrow (Cx \rightarrow \exists y(Hy \wedge K(yx)))$ OR $\forall x(Bx \wedge Cx \rightarrow \exists y(Hy \wedge K(yx)))$

S5.132 For a business to be a restaurant, it is not sufficient that people by food from it.

Either, it is not the case that if people buy food from a business then it's a restaurant OR Some businesses that people buy food from are not restaurants.

$\sim\forall x(Bx \wedge \exists y(Hy \wedge \exists z(Fz \wedge M(yzx))) \rightarrow Ax)$ OR $\exists x(Bx \wedge \exists y(Hy \wedge \exists z(Fz \wedge M(yzx))) \wedge \sim Ax)$

S5.133 Unless a person eats at restaurants every day, that person has to buy food from a store.

$\forall x(Hx \rightarrow \forall y(Dy \rightarrow \exists z(Az \wedge L(xzy))) \vee \exists y(Fy \wedge \exists z(Cz \wedge M(xyz))))$

S5.134 If anybody shops at a store, then somebody buys things from somebody.

$\exists x(Hx \wedge \exists y(Cy \wedge K(xy))) \rightarrow \exists x(Hx \wedge \exists y\exists z(Hz \wedge M(xyz)))$

$\exists x\exists y\ (Hx \wedge Cy \wedge K(xy)) \rightarrow \exists x\exists y\exists z(Hx \wedge Hz \wedge M(xyz)))$

S5.135 If anybody shops at a store, he/she buys something from somebody.

$\forall x(Hx \wedge \exists y(Cy \wedge K(xy)) \rightarrow \exists z\exists w(Hz \wedge M(xwz)))$

$\forall x\forall y(Hx \wedge Cy \wedge K(xy)) \rightarrow \exists z\exists w(Hz \wedge M(xwz)))$ or

$\forall x\forall y\exists z\exists w\ (Hx \wedge Cy \wedge K(xy)) \rightarrow Hz \wedge M(xwz))$

S5.136 Everybody buys things from stores, but no store sells things to everybody.

$\forall x(Hx \rightarrow \exists y\exists z(Cz \wedge M(xyz))) \wedge \sim\exists x(Cx \wedge \forall y(Hy \rightarrow \exists zM(yzx)))$

S5.137 Not every business that sells food to people is a restaurant.

$\exists x(Bx \wedge \exists y(Fy \wedge \exists z(Hz \wedge M(zyx))) \wedge \sim Ax)$

S5.138 Some people don't shop at stores unless those stores are less expensive than Holt Renfrew.

$\exists x(Hx \wedge \forall y(Cy \rightarrow \sim K(xy) \vee J(by)))$ OR $\exists x(Hx \wedge \forall y(Cy \rightarrow (K(xy) \rightarrow J(by))))$

OR $\exists x(Hx \wedge \forall y(Cy \rightarrow (\sim J(by) \rightarrow \sim K(xy))))$

S5.139 Although Holt Renfrew is more expensive than Honest Ed's, not everything that Holt Renfrew sells to people is more expensive than everything that Honest Ed's sells to people.

$J(ba) \wedge \sim\forall x(\exists y(Hy \wedge M(yxb)) \rightarrow \forall z(\exists w(Hw \wedge M(wza)) \rightarrow J(xz))))$

$J(ba) \wedge \sim\forall x\forall y(Hy \wedge M(yxb)) \rightarrow \forall z\forall w(Hw \wedge M(wza) \rightarrow J(xz)))$

$J(ba) \wedge \sim\forall x\forall y\forall z\forall w(Hy \wedge M(yxb) \wedge Hw \wedge M(wza) \rightarrow J(xz)))$

$J(ba) \wedge \exists x\exists y\exists z\exists w(Hy \wedge M(yxb) \wedge Hw \wedge M(wza) \wedge \sim J(xz)))$

S5.140 Everybody eats at a restaurant some days, but nobody eats at restaurants every day.

$\forall x(Hx \rightarrow \exists y(Ay \wedge \exists z(Dz \wedge L(xyz)))) \wedge \sim\exists x(Hx \wedge \forall y(Dy \rightarrow \exists z(Az \wedge L(xzy))))$

$\forall x\exists y\exists z(Hx \rightarrow Ay \wedge Dz \wedge L(xyz)) \wedge \forall x(Hx \rightarrow \sim\forall y(Dy \rightarrow \exists z(Az \wedge L(xzy))))$

$\forall x\ (Hx \rightarrow \exists z\exists y(Ay \wedge Dz \wedge L(xyz))) \wedge \forall x(Hx \rightarrow \exists y(Dy \wedge \sim\exists z(Az \wedge L(xzy))))$

$\forall x\ (Hx \rightarrow \exists z(Dz \wedge \exists y(Ay \wedge L(xyz)))) \wedge \forall x(Hx \rightarrow \exists y(Dy \wedge \forall z(Az \rightarrow \sim L(xzy))))$

S5.141 A business that sells things that are more expensive than anything people buy from any store is not a place where people shop.

This was a bit tricky… The subject: all stores. What it says: if the store is such that something it sells is more expensive than anything that any store sells to anybody, then nobody shops at that store.

$\forall x(Bx \rightarrow (\exists y\exists z(Hz \wedge M(zyx) \wedge \forall s\forall t\forall w(Cs \wedge Ht \wedge M(tws) \rightarrow J(yw))) \rightarrow {\sim}\exists i(Hi \wedge K(ix))))$

or $\forall x(Bx \wedge \exists y\exists z(Hz \wedge M(zyx) \wedge \forall s\forall t\forall w(Cs \wedge Ht \wedge M(tws) \rightarrow J(yw))) \rightarrow \forall i(Hi \rightarrow {\sim}K(ix)))$

S5.142 Some people who shop at exactly the same stores as each other, don't buy anything from the same person.

$\exists x\exists y(Hx \wedge Hy \wedge \forall z(Cz \rightarrow (K(xz) \leftrightarrow K(yz))) \wedge {\sim}\exists w(Hw \wedge \exists iM(xiw) \wedge \exists jM(yjw)))$

OR

$\exists x(Hx \wedge \exists y(Hy \wedge \forall z(Cz \wedge K(xz) \leftrightarrow Cz \wedge K(yz)) \wedge \forall w(Hw \rightarrow {\sim}(\exists iM(xiw) \wedge \exists jM(yjw)))))$

S5.143 Nobody buys everything they buy from the same store.

${\sim}\exists x(Hx \wedge \exists y(Cy \wedge \forall z(\exists wM(xzw) \rightarrow M(xzy))))$ OR

$\forall x(Hx \rightarrow {\sim}\exists y(Cy \wedge \forall z(\exists wM(xzw) \rightarrow M(xzy))))$

$\forall x(Hx \rightarrow \forall y(Cy \rightarrow {\sim}\forall z(\exists wM(xzw) \rightarrow M(xzy))))$

or $\forall x(Hx \rightarrow \forall y(Cy \rightarrow \exists z\exists w(M(xzw) \wedge {\sim}M(xzy))))$

S5.144 Every store sells things to someone. (Ambiguous – symbolize two different ways.)

$\forall x(Cx \rightarrow \exists y\exists z(Hz \wedge M(zyx)))$ All stores sell at least one thing to at least one person.

$\exists x(Hx \wedge \forall y(Cy \rightarrow \exists zM(xzy)))$ There is somebody who every store sells something to.

S5.145 There are restaurants where people eat every day. (Ambiguous – symbolize two different ways)

$\exists x(Ax \wedge \forall y(Dy \rightarrow \exists z(Hz \wedge L(zxy)))$ There is at least one restaurant such that everyday people eat there.

$\exists x(Ax \wedge \exists z(Hz \wedge \forall y(Dy \rightarrow L(zxy)))$ There is at least one restaurant such that at least one person eats there every day.

S5.146 Somebody eats at some restaurant every day. (Ambiguous – symbolize four different ways.)

$\exists x(Hx \wedge \exists y(Ay \wedge \forall z(Dz \rightarrow L(xyz)))$ Some one person eats at some one restaurant every day.

$\exists x(Hx \wedge \forall z(Dz \rightarrow \exists y(Ay \wedge L(xyz)))$ Some one person eats at some restaurant or another every day.

$\exists y(Ay \wedge \forall z(Dz \rightarrow \exists x(Hx \wedge L(xyz)))$ There is a restaurant and every day someone or another eats there.

$\forall z(Dz \rightarrow \exists x(Hx \wedge \exists y(Ay \wedge L(xyz)))$ Every day, someone or another eats at some restaurant or another.