lib/basic/fset.ath

```
(structure (FSet-Of T)
  null
  (insert T (FSet-Of T)))

(declare union ((T) -> ((FSet-Of T) (FSet-Of T)) (FSet-Of T)))

(declare in ((T) -> (T (FSet-Of T)) Boolean))

(define in-axiom-1
  (forall ?x (not (in ?x null))))

(define in-axiom-2
  (forall ?x ?y ?S (iff (in ?x (insert ?y ?S))
                        (or (= ?x ?y) (in ?x ?S)))))

(define in-axioms [in-axiom-1 in-axiom-2])

(define-symbol (subset ?S1 ?S2)
  (forall ?x
    (if (in ?x ?S1) (in ?x ?S2))))

(define ext-axiom
  (forall ?S1 ?S2
    (if (and (subset ?S1 ?S2) (subset ?S2 ?S1))
        (= ?S1 ?S2))))

(define union-axiom
  (forall ?x ?S1 ?S2
    (iff (in ?x (union ?S1 ?S2))
         (or (in ?x ?S1) (in ?x ?S2)))))


(declare singleton ((T) -> (T)  (FSet-Of T)))

(define singleton-axiom
  (forall ?x ?y
    (iff (in ?x (singleton ?y))
         (= ?x ?y))))

(define fset-axioms (join [ext-axiom union-axiom singleton-axiom] in-axioms))

(assert fset-axioms)
```