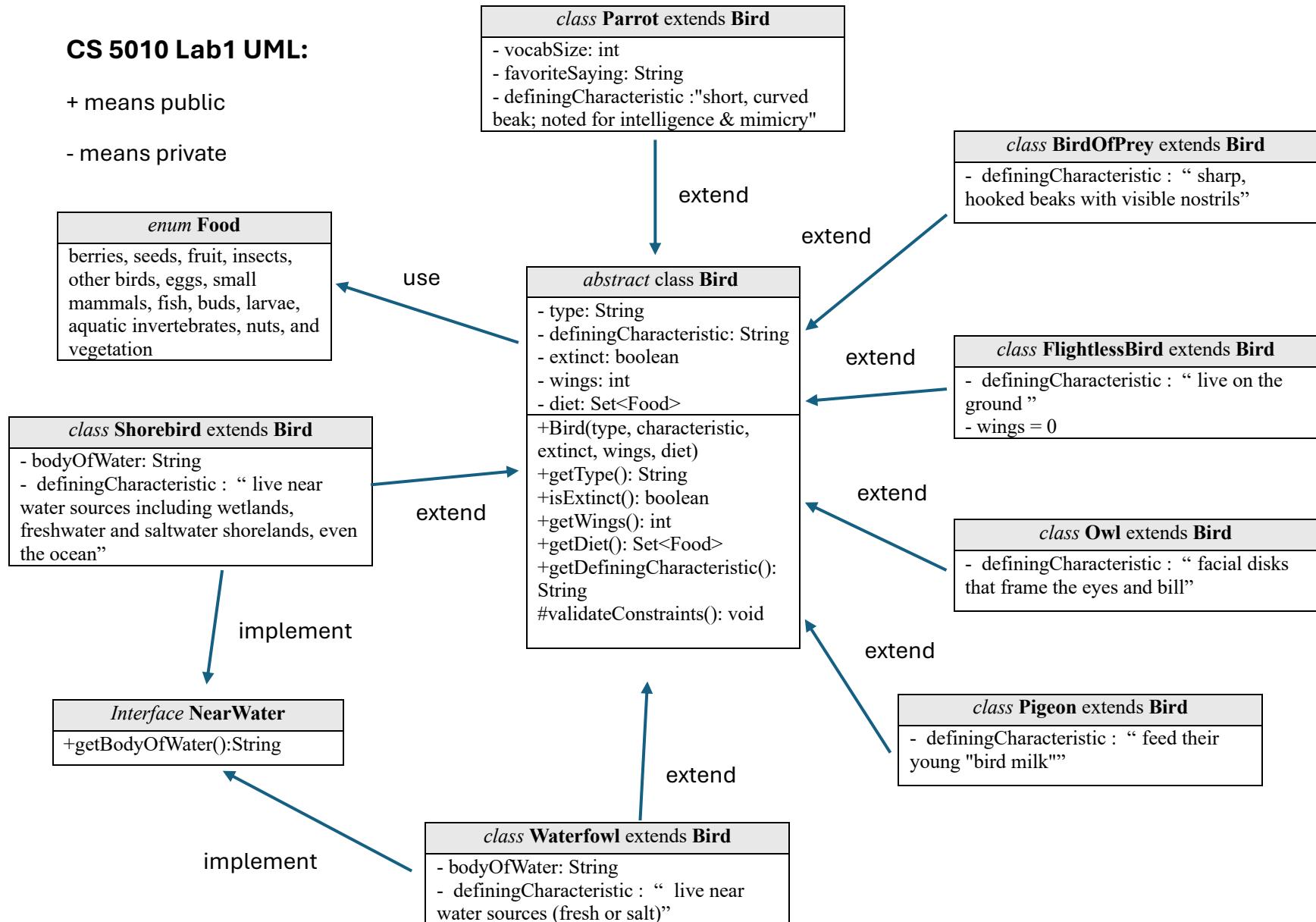


CS 5010 Lab1 UML:

+ means public

- means private



Testing Plan:

1. What we need to check?

- Every bird tracks: type, fixed definingCharacteristic, extinct, wings, diet(2–4).
- “Near water” birds (Shorebird, Waterfowl) also track bodyOfWater.
- Parrot tracks vocabSize and favoriteSaying.
- FlightlessBird always initializes with 0 wings.
- The fixed definingCharacteristic is hard-coded per subclass.
-

2. Example Test cases

ID	Condition	Example Input	Expected
T1	Create BirdOfPrey (valid)	type="bald eagle", extinct=false, wings=2, diet={FISH, SMALL_MAMMALS, OTHER_BIRDS}	All getters return provided values; defChar="sharp, hooked beaks with visible nostrils"
T2	Create Owl (valid)	type="barn owl", wings=2, diet={SMALL_MAMMALS, INSECTS}	defChar="facial disks framing the eyes and bill"
T3	Create Pigeon (valid)	type="passenger pigeon", extinct=true, diet={SEEDS, BERRIES}	defChar="feed young 'bird milk' similar to mammals"
T4	Create Parrot with extras(valid)	type="gray parrot", vocabSize=100, favorite="Hello!", diet={NUTS, FRUIT, SEEDS}	getVocabSize()==100, getFavoriteSaying()=="Hello!", parrot defChar fixed
T5	FlightlessBird wings enforcement	type="emu", diet={VEGETATION, SEEDS, FRUIT}	getWings()==0 regardless of any suggestion (constructor doesn't accept wings)
T6	Shorebird requires bodyOfWater	type="horned puffin", diet={FISH, AQUATIC_INVERTS}, body="North Pacific"	getBodyOfWater()=="North Pacific", defChar mentions near water
T7	Waterfowl requires bodyOfWater	type="mallard duck", diet={VEGETATION, AQUATIC_INVERTS, SEEDS}, body="Lake Washington"	OK; NearWater observable
T8	Diet size = 2 (min boundary)	any subclass with diet size 2	OK
T9	Diet size = 4 (max boundary)	any subclass with diet size 4	OK

T10	Diet size < 2	diet size 1	IllegalArgumentException("diet must contain 2–4 distinct items")
T11	Diet size > 4	diet size 5	same exception
T12	Null diet	diet=null	IllegalArgumentException("diet required")
T13	Wings out of range	wings = -1 or 3 (for classes that accept wings)	IllegalArgumentException("wings must be between 0 and 2")
T14	Null/blank type	type=null or " "	IllegalArgumentException("type required")
T15	NearWater missing water	new Shorebird(..., bodyOfWater=null)	IllegalArgumentException("bodyOfWater required...")
T16	Parrot negative vocab	vocabSize=-1	IllegalArgumentException("vocabSize cannot be negative")
T17	Parrot favorite sayings null	favoriteSaying=null	IllegalArgumentException("favoriteSaying required (can be empty)")
T18	Fixed definingChar strings	create each subclass	getDefiningCharacteristic() equals the exact expected phrase for that subclass
T19	Diet is unmodifiable	call bird.getDiet().add(...)	UnsupportedOperationException
T20	Input-set defensive copy	pass a mutable set, mutate it after construction	bird's getDiet() unchanged
T21	Polymorphism check	keep references as Bird, test instanceof NearWater	only Shorebird/Waterfowl match; can safely cast & call getBodyOfWater()
T22			
T23			
T24			
T25			