AP® Computer Science AB
2008 Scoring Guidelines

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Question 1: Anagram Set

Part A: constructor **4 points**

+1/2 `groups = new HashMap<String, HashSet<String>>();`

+1 traverse `words`
- **+1/2** correctly access an element of `words` (in context of loop)
- **+1/2** access all elements of `words` (lose this if index out-of-bounds)

+2 1/2 store anagram sets in `groups` (in context of loop)
- **+1/2** `createKeyString(`*accessedWord*`)`
- **+1** correct if keyString not already stored
- **+1** correct if keyString already stored

Part B: findLargestSets **5 points**

+1/2 construct a `HashSet<HashSet<String>>` object (must assign to a variable)

+1 1/2 iterate through anagram sets
- **+1** correctly access an anagram set (in context of loop)
- **+1/2** access all anagram sets (loop/iteration structure is correct)

+2 1/2 find largest sets
- **+1/2** determine size of anagram set
- **+1** update largest (in context of loop)
  - **+1/2** compare size with size of some previous set
  - **+1/2** add to set of sets if size >= largest so far
- **+1** correctly construct set of largest sets

+1/2 return set of largest sets

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Question 2: Cache List

Part A: get **5 points**

+2 determine start location
- **+1** correct in first call to `get (front)`
- **+1** correct in subsequent calls to `get (front` or `remNode)`

+2 traverse to desired node (in context of loop)
- **+1/2** call to `getNext()`
- **+1/2** accesses more than one successive node (if needed)
- **+1** identifies desired node (may assume that `remNode` is not null)

+1/2 update `remNode` and `remIndex`

+1/2 return value at identified node

Part B: addFirst **2 1/2 points**

+1 add object
- **+1/2** create `ListNode` object containing `obj` and `front`
- **+1/2** update `front` to refer to new node

+1 1/2 update state
- **+1/2** increment `listSize`
- **+1** increment `remIndex` (if not previously -1)

Part C: Big-Oh **1 1/2 points**

+1/2 $O(n^2)$ for `LinkedList printForward` and `printReverse`
+1/2 O(n) for `APList printForward`
+1/2 $O(n^2)$ for `APList printReverse`

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Question 3: MultiGrid (GridWorld)

Part A: get **2 1/2 points**

+1/2 `grid.get(loc)`

+1 1/2 null case
- **+1/2** check if `grid` contents are null
- **+1/2** construct empty set if null (nongeneric okay)
- **+1/2** return empty set if null (lose this if add set to grid)

+1/2 return `grid` contents if not null

Part B: put **2 points**

+1/2 `get(loc)` (or `grid.get(loc)` with null check)

+1/2 add `obj` to accessed set (or empty set, as required)

+1/2 `grid.put(loc,`*updatedSet*`)` (in empty case)

+1/2 correct in all cases

Part C: getNeighbors **4 1/2 points**

+1/2 construct an `ArrayList` of `Object`s (must store in a variable)

+3 1/2 add neighbors to list
- **+1/2** access a neighboring location (e.g., `grid.getNeighbors(loc)` or `loc.getAdjacentLocation(`*dir*`)`)
- **+1 1/2** traverse sets from neighboring locations
  - **+1/2** correctly access a neighboring set (in context of loop)
  - **+1** access all neighboring sets
- **+1** traverse accessed set of neighbors
  - **+1/2** correctly access an element of set (in context of loop)
  - **+1/2** access all elements of set
- **+1/2** add neighbor object to neighbor list

+1/2 return neighbor list

Note: -1 usage error for accessing `occupantMap` in Parts (A) and (B)

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Question 4: Filter Objects (Design)

Part A:	OrFilter	**5 points**

+1/2 `class OrFilter implements Filter`

+1/2 declare `private` instance variable(s) capable of storing a collection of `Filter`s
Note: Two Filters suffice, as long as `add` builds and stores complex filters.

+1/2 constructor, `add`, `accept` headers correct
Note: If `add` does not return void, must return a legal value.

+1/2 constructor stores both parameters in instance variable(s) (initialize if necessary)

+1/2 `add` stores parameter in instance variable(s)

+2 1/2 `accept`
- **+1** access stored filters
  - **+1/2** correctly access a stored filter (if in a collection, must be in a loop)
  - **+1/2** access all stored filters (lose this if index out-of-bounds)
- **+1 1/2** determine whether to accept
  - **+1/2** call `accept(`*text*`)` on an accessed filter
  - **+1** return correct boolean value in all cases

Part B:	buildFilter	**4 points**

+1 access all elements of `desirable` (lose this if index out-of-bounds)

+1 construct `SimpleFilter` for each `desirable` element and `notAllowed`

+1 correctly construct all complex filters (must have at least one complex filter)

+1 build and return correct filter

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