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* Gary Vartanian

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Formal concepts and closure operators

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* **Many-valued contexts and conceptual scaling**

**QUIZ • 2H**

**Formal concepts and closure operators**

**Submit your assignment**

**DUE**Jan 19, 11:59 PM PST

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**Grade**

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We keep your highest score

Formal concepts and closure operators

Graded Quiz • 2h

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**Formal concepts and closure operators**

**LATEST SUBMISSION GRADE**

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**1.Question 1**

**Which attributes are in {Camper, Classic}*'*?**

**A close up of a map

Description automatically generated**

Reamer

Can Opener

Screwdriver

Cap Lifter

Medium Blade

Large Blade

Key Ring

**Correct**

Both Camper and Classic have Key Ring.

Tweezers

**Correct**

Both Camper and Classic have Tweezers.

Toothpick

**Correct**

Both Camper and Classic have Toothpick.

Corkscrew

Phillips Screwdriver

Scissors

Wood Saw

Manicure Blade

Small Blade

Saw Blade

Magnifier

Inch-Metric Ruler

Fish-Scaler

Fine Screwdriver

**1 / 1 point**

**2.Question 2**

**Which objects are in {Camper, Classic}*''*?**

**A close up of a map

Description automatically generated**

Spartan

New Tinker

Climber

**Correct**

Climber has all the attributes from {Camper, Classic}*'*.

Camper

**Correct**

*A* is a subset of *A''* for any set *A*. In particular, {Camper, Classic} is a subset of {Camper, Classic}*''*.

Classic

**Correct**

*A* is a subset of *A''* for any set *A*. In particular, {Camper, Classic} is a subset of {Camper, Classic}*''*.

Explorer

**Correct**

Explorer has all the attributes from {Camper, Classic}*'*.

Outdoorsman

**Correct**

Outdoorsman has all the attributes from {Camper, Classic}*'*.

Champion

**Correct**

Champion has all the attributes from {Camper, Classic}*'*.

**1 / 1 point**

**3.Question 3**

**{Classic, Climber, Explorer, Champion}*''* = {Classic, Climber, Explorer, Champion}?**

**A close up of a map

Description automatically generated**

Yes

No

**Correct**

Outdoorsman has all the attributes shared by Classic, Climber, Explorer, and Champion, and thus it is in {Classic, Climber, Explorer, Champion}*''*.

**1 / 1 point**

**4.Question 4**

**How many formal concepts does this context have? Remember that every context has a concept covering the set of all objects and one covering the set of all attributes.**

**A screenshot of a cell phone

Description automatically generated**

5

**Correct**

**1 / 1 point**

**5.Question 5**

**How many formal concepts does this context have? Remember that every context has a concept covering the set of all objects and one covering the set of all attributes.**

**A close up of a device

Description automatically generated**

8

**Correct**

Here every pair (*A*, *A'*), where *A* is a subset of {sea, river, pond} is a formal concept.

**1 / 1 point**

**6.Question 6**

**How many formal concepts does this context have? Remember that every context has a concept covering the set of all objects and one covering the set of all attributes.**

**A close up of a device

Description automatically generated**

3

**Correct**

The concepts of this context form a *chain*: they can be linearly ordered so that the extent of every concept (but the last one) is a subset of the extent of the next concept in this order (and thus it is *less general*than the next concept).

**1 / 1 point**

**7.Question 7**

**How many formal concepts does this context have? Remember that every context has a concept covering the set of all objects and one covering the set of all attributes.**

**A screenshot of a cell phone

Description automatically generated**

9

**Incorrect**

**0 / 1 point**

**8.Question 8**

**Which of the following set families are closure systems?**

The subtrees of a tree (or, more precisely, the vertex sets of subtrees of a tree, including the empty vertex set).

**Correct**

The intersection of the vertex sets of two subtrees is always the vertex set of a subtree due to the following fact: if two vertices *u* and *v* belong to a subtree *S*, their nearest common ancestor *a*and all the vertices on the paths from *a* to *u* and *v* must also belong to *S*.

The subintervals of the real interval [0, 1], including the empty interval.

**Correct**

The intersection of two subintervals of [0, 1] is always a subinterval of [0, 1].

All binary relations *R* on base set *M* such that (*x*, *y*) ∈ *R* or (*y*, *x*) ∈ *R* for all *x*≠ *y* from *M*.

All transitive binary relations on base set *M*, i.e., relations *R* such that, for all *x*, *y*, *z* ∈ *M*, if (*x*, *y*) ∈ *R* and (*y*, *z*) ∈ *R*, then (*x*, *z*) ∈ *R*.

**Correct**

The intersection of two transitive relations is always transitive. Also, the relation *M* x *M* is transitive.

**1 / 1 point**

**9.Question 9**

**Which of the following definitions of operator *φ* are correct definitions of a closure operator?**

For *X* ⊆ [0, 1], let *φX* be the smallest interval containing all elements of *X* .

**Correct**

*X* ⊆ *φX* for any *X*; thus *φ* is extensive. It is monotone, since the smallest interval containing all elements of *X* also contains all elements of every subset of *X*. It is idempotent, because *φX* is an interval and applying *φ* to an interval yields this very interval.

For *X* ⊆ [0, 1], let *φX* be the largest interval included in *X*; if *X* has several largest subintervals, *φX* is the one with the smallest left endpoint.

Let (*V*, *E*) be a complete undirected graph: there is an edge in *E* between any two vertices from *V*. For *F* ⊆ *E*, define *φF* as follows: *φF* contains all edges from *F* and all edges (*u*, *v*) such that neither *u* ∈ *V* nor *v* ∈ *V* is part of any edge in *F*; in other words, *u* and *v* are isolated vertices in graph (*V*, *F*).

**1 / 1 point**