Review Test Submission: Quiz 6

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Unit	Discrete Structures
Test	Quiz 6
Started	18/05/17 2:58 PM
Submitted	18/05/17 2:58 PM
Status	Completed
Attempt Score	0 out of 100 points
Time Elapsed	450 hours, 19 minutes
Instructions	You will have 2 attempts. The higher score will count to your mark. The deadline is Friday May 19, at 11:59pm. Choose the best answer for each question.
Results Displayed	All Answers, Correct Answers

Question 1

0 out of 5 points

Which of the following is true?

Answers: $\{1, 0\} = (1, 0)$

✔ $\{0, 1\} = \{1, 0\}$

$(0, 0) = (0)$

$(0, 1) = (1, 0)$

Question 2

0 out of 5 points

A relation:

Answers: ✔ Can possibly be neither symmetric nor anti-symmetric.

Is only reflexive if it is first symmetric.

Is only symmetric if it is first reflexive.

Is called anti-symmetric if it is not symmetric.

Question 3

0 out of 5 points

The relation $\subseteq$ is:

Answers: Not an equivalence relation since it is not transitive.

A total ordering.

Not a partial ordering since it is not anti-symmetric.

✔ A partial ordering.

Question 4

0 out of 5 points

Define the relation R over the set of all people in Australia by aRb if a is married to b. Then R is:

Answers: Neither symmetric nor anti-symmetric.

Reflexive and symmetric.

Anti-symmetric and reflexive.

✔ Irreflexive and symmetric.

Question 5

0 out of 5 points

Define the relation R over the set of all species where aRb if a and b are in the same genus. (As a reminder, every species has a genus. Humans' genus is Homo, lions and tiggers are both in genus Panthera.) Then R is:

Answers: A total ordering.

✔ An equivalence relation.

A partial ordering.

A function with an inverse.

Question 6

0 out of 5 points

Define the relation R over the set of all married people in Australia where aRb if a is married to b. Then R is:

Answers: ✔ A function with an inverse.

A total ordering.

An equivalence relation.

A partial ordering.

Question 7

0 out of 5 points

Define the relation R over the set of all people where aRb if $a = b$ or if b has lived in all the countries that a has, and at least one more. Then R is:

Answers:

A partial ordering.

A total ordering.

A function with an inverse.

An equivalence relation.

Question 8

0 out of 5 points

Define the relation R on the set $\mathbb{Z}$ by

$$R = \{(a, b) \in \mathbb{Z}^2 : a^2 = b^2\}.$$

Then R is:

Answers:

An equivalence relation, where the equivalence classes are the sets $\{x, \sqrt{x}\}$ for each $x \in \mathbb{Z}$ such that $\sqrt{x} \in \mathbb{Z}$.

A function, which is its own inverse.

A function, which we would usually write as the formula $f(x) = x^2$.

An equivalence relation, where the equivalence classes are the sets $\{x, -x\}$ for each $x \in \mathbb{Z}$.

Question 9

0 out of 5 points

A relation is called a *strict ordering* if it is irreflexive, transitive and anti-symmetric. An example of a strict ordering is:

Answers:

The relation over people given by aRb if b is a's ancestor.

$\leq$

$\subseteq$

$a \equiv b \pmod{n}$

Question 10

0 out of 5 points

The equality relation $=$ on any set S is:

Answers:

A function with an inverse, and an equivalence relation with as single equivalence class equal to S

A total ordering and a function with an inverse.

An equivalence relation and also a total ordering.

✔ An equivalence relation and also function with an inverse.

Question 11

0 out of 5 points

A binary operation on a set S, takes any two elements $a, b \in S$ and produces another element $c \in S$. Examples of binary operations include addition and multiplication on the set $\mathbb{N}$. A binary operation is therefore:

Answers:

✔ A function with domain $S \times S$ and co-domain S.

A partial ordering on S.

A function with domain S and range S.

A binary relation over S.

Question 12

0 out of 5 points

Relations are just sets, so we can use set operations on them. Suppose that R and Q are both reflexive binary relations over S and define relations $U = R \cup Q$ and $V = R \cap Q$. Then:

Answers:

Only V is a reflexive relation.

✔ U and V are both reflexive relations.

Only U is a reflexive relation.

We don't have enough information to decide whether U or V is reflexive.

Question 13

0 out of 5 points

Functions are relations, and relations are sets, so we can do set operations on functions. Suppose R and Q are both binary relations over S which are also functions. Suppose $R \neq Q$ and define relations $U = R \cup Q$ and $V = R \cap Q$. Then:

Answers:
- Only U is a function with domain S.
- ✔ Neither U nor V is a function with domain S.
- Only V is a function with domain S.
- U and V are both functions with domain S.

Question 14

0 out of 5 points

The relation $\{(a,0),(c,3),(b,3),(d,2)\}$ is:

Answers:
- ✔ A function without an inverse.
- A function with an inverse.
- Not a function.
- Not a function, but has an inverse.

Question 15

0 out of 5 points

Given the function f where $f(x)$ is the last name of the QUT student with student number x, the domain of f is:

Answers:
- The set of strings of the form $nXXXXXXX$, where the X's are digits.
- The set of last names for all students at QUT.
- ✔ The set of student numbers for all students at QUT.
- The set of strings of letters.

Question 16

0 out of 5 points

Given the function $f(x) = x^2$ defined on $\mathbb{Z}$, the range of f is:

Answers:
- ✔ $\{x \in \mathbb{Z} : x = z^2, z \in \mathbb{Z}\}$
- $\mathbb{Z} \setminus \{0\}$

$\{x \in \mathbb{Z} : x \geq 0\}$

$\mathbb{Z}$

Question 17

0 out of 5 points

A recursive definition of some mathematical object:

Answers: Has at least one case defined in terms of the the definition of the object itself.

Has at least one base case and at least one case defined in terms of the the definition of the object itself.

Cannot refer to the definition itself to avoid circularity.

Has at least one base case (defining the function for 0) and at least one case defined in terms of the the definition of the object itself.

Question 18

0 out of 5 points

Define the function f on $\mathbb{R}$ by

$$f(x) = \begin{cases} 0 & : x \leq 0 \\ x & : x > 0 \end{cases}$$

Then f is:

Answers: Not defined recursively, and f has no inverse.

Defined recursively, with two base cases.

Defined recursively, with one base case.

Not defined recursively.

Question 19

0 out of 5 points

Define the function f on $\mathbb{N}$ by

$$f(x) = \begin{cases} 0 & : x = 0 \\ 1 & : x = 1 \\ 2f(x-1) + f(x-2) & : x > 1 \end{cases}$$

Then f is:

Answers: Defined recursively, with one base case.

Not defined recursively, and f has no inverse.

Defined recursively, with two base cases.

Not defined recursively.

Question 20

0 out of 5 points

Lexicographic ordering on bit strings:

Answers: Is not a partial ordering since it is not transitive.

Is a total ordering.

Is only a partial ordering, and not a total ordering.

Is a function from bit strings to bit strings.

Tuesday, 6 June 2017 9:18:38 AM AEST

← **OK**