TỔNG LIÊN ĐOÀN LAO ĐỘNG VIỆT NAM
TRƯỜNG ĐẠI HỌC TÔN ĐỨC THẮNG
KHOA CÔNG NGHỆ THÔNG TIN

TIỂU LUẬN GIỮA KÌ MÔN CẤU TRÚC RỜI RẠC

DISCRETE STRUCTURES ESSAY

Người hướng dẫn: **Thầy TRẦN LƯƠNG QUỐC ĐẠI**
Người thực hiện: **PHẠM PHƯỚC TẤN– 520H0418**
Lớp   **: 20H50204**
Khoá   **: 24**

THÀNH PHỐ HỒ CHÍ MINH, NĂM 2021

TỔNG LIÊN ĐOÀN LAO ĐỘNG VIỆT NAM
TRƯỜNG ĐẠI HỌC TÔN ĐỨC THẮNG
KHOA CÔNG NGHỆ THÔNG TIN

TIỂU LUẬN GIỮA KÌ MÔN CẤU TRÚC RỜI RẠC

DISCRETE STRUCTURES ESSAY

Người hướng dẫn: **Thầy TRẦN LƯƠNG QUỐC ĐẠI**
Người thực hiện: **PHẠM PHƯỚC TẤN**
                 Lớp   : **20H50204**
                 Khoá   : **24**

THÀNH PHỐ HỒ CHÍ MINH, NĂM 2021

LỜI CẢM ƠN

Em xin cảm ơn thầy Trần Lương Quốc Đại đã hướng dẫn và giải đáp thắc mắc của bài tiểu luận giữa kì môn Cấu Trúc Rời Rạc ạ để em có thể đủ kiến thức và sự học hỏi để có thể cố gắng làm bài tiểu luận này ạ.

ĐỒ ÁN ĐƯỢC HOÀN THÀNH
TẠI TRƯỜNG ĐẠI HỌC TÔN ĐỨC THẮNG

Tôi xin cam đoan đây là sản phẩm đồ án của riêng tôi và được sự hướng dẫn của Thầy Trần Lương Quốc Đại;. Các nội dung nghiên cứu, kết quả trong đề tài này là trung thực và chưa công bố dưới bất kỳ hình thức nào trước đây. Những số liệu trong các bảng biểu phục vụ cho việc phân tích, nhận xét, đánh giá được chính tác giả thu thập từ các nguồn khác nhau có ghi rõ trong phần tài liệu tham khảo.

Ngoài ra, trong đồ án còn sử dụng một số nhận xét, đánh giá cũng như số liệu của các tác giả khác, cơ quan tổ chức khác đều có trích dẫn và chú thích nguồn gốc.

Nếu phát hiện có bất kỳ sự gian lận nào tôi xin hoàn toàn chịu trách nhiệm về nội dung đồ án của mình. Trường đại học Tôn Đức Thắng không liên quan đến những vi phạm tác quyền, bản quyền do tôi gây ra trong quá trình thực hiện (nếu có).

TP. Hồ Chí Minh, ngày 14 tháng 11 năm 2021

Tác giả

(ký tên và ghi rõ họ tên)

Phạm Phước Tấn

PHẦN XÁC NHẬN VÀ ĐÁNH GIÁ CỦA GIẢNG VIÊN

Phần xác nhận của GV hướng dẫn

_____
_____
_____
_____
_____
_____
_____

Tp. Hồ Chí Minh, ngày   tháng   năm
(kí và ghi họ tên)

Trần Lương Quốc Đại

Phần đánh giá của GV chấm bài

_____
_____
_____
_____
_____
_____

Tp. Hồ Chí Minh, ngày   tháng   năm
(kí và ghi họ tên)

TÓM TẮT

Bài Tiểu luận giữa kì nhằm kiểm tra sinh viên các kiến thức đã học trước thi giữa kì để xem mức độ sinh viên hiểu biết và nghe giảng.Trong bài tiểu luận giữa kì môn Cấu Trúc Rời Rạc, ở vấn đề một thì đề kiểm tra độ nhạy bén cũng như tư duy tìm mật khẩu của sinh viên nhưng câu này ở mức độ nhận biết, ở vấn đề hai thì hệ thống các mệnh đề kéo theo trong chương đầu tiên, ở vấn đề ba thì cũng như vấn đề hai nhưng ở vấn đề này có khác là cho những ví dụ thực tế cho từng ngụy biện, ở vấn đề bốn thì chúng ta sẽ chơi một trò chơi khá quen thuộc đối với sinh viên khi học môn này đó là trò chơi Tarski's world và ở vấn đề này thì nhằm kiểm tra độ tư duy và hệ thống kiến thức của chương hai với hai kiến thức chính đó là mệnh đề "Với mọi" và "Tồn tại duy nhất", ở vấn đề năm thì đề lại tiếp tục kiểm tra về mệnh đề kéo theo nhưng ở vấn đề này là cho ngôn ngữ tự nhiên rồi sẽ ghi lại bằng biểu thức logic, vấn đề cuối cùng kiểm tra sinh viên về vẽ bảng chân trị và dùng mười luật đã học ở phần đầu tiên của chương một để chứng minh biểu thức logic có tương đương với nhau hay không.

MỤC LỤC

DANH MỤC KÍ HIỆU VÀ CHỮ VIẾT TẮT

DANH MỤC CÁC BẢNG BIỂU, HÌNH VẼ, ĐỒ THỊ

CHƯƠNG 1 – MỞ ĐẦU

Discrete structures is the most important subject to all students information technology faculty like each different majors of faculty, This subject is practising for all students who was mindset and solving about some problems so that the most flexible and easy to understand it.At midterm essay has six main problems that need to solve and consider knowledge of students what level you are in the last online class.

CHƯƠNG 2 – PROBLEMS

2.1 Part 1

2.1.1 Problem 1

This password is 123.

From the e suggestion has 956 which all numbers are incorrect, therefore we'll remove number 5 at the b suggestion and at the b suggestion just remain two numbers that are 8 and 1.

We consider at the c suggestion, suppose number 4 is correct and in the correct position and at the a suggestion is number 4 which is correct number but in an incorrect position so number 4 is wrong number and remove it at the a and c suggestions so the a suggestion is only left two numbers that are 7 and 2 and then the c suggestion is still remaining two numbers which are 8 and 3. Continue, then suppose number 8 at the c suggestion is true number and in the correct position then at the b suggestion is number 8 is correct number but it's in an incorrect position so number 8 is false number. Therefore, we remove it at the b and c suggestions. After that, the b suggestion has one number is true which is number 1 but it's in the incorrect position at the third position and at the c suggestion is only left number 3 which is correct number and in the

correct position at the third position.Finally, we have two numbers which are correct that are 1 and 3.

From two numbers correct are 1 and 3 so at the d suggestion which has 317 but in this has two numbers which are true number but two numbers are in the incorrect position so easy to see 3 and 1 numbers that are true number but incorrect position. The number 3 is in the correct position at the third position and the number 1 is in an incorrect position at the third and second positions so it is in the correct position at the first position. At the d suggestion just has two numbers correct which are 1 and 3 so number 7 is an incorrect number. Simultaneously, the number 7 at the a suggestion is correct number so the number 2 is true number but it is in the incorrect position at the third position so the number 2 is true position at the first or the second positions, the first position was number 1 therefore number 2 is at the second position. Finally, this password which we need to find that is 123.

2.1.2 Problem 2

a. "If a man, holding a belief which he was taught in childhood or persuaded of afterwards, keeps down and pushes away any doubts which arise about it in his mind, purposely avoids the reading of books and the company of men that call in question or discuss it, and regards as impious those questions which cannot easily be asked without disturbing it - the life of that man is one long sin against mankind."

The Ethics of Belief (1877) by William K. Clifford.

Converse: "If the life of that man is one long sin against mankind, then a man, holding a belief which he was taught in childhood or persuaded of afterwards, keeps down and pushes away any doubts which arise about it in his

mind,   purposely avoids the reading of books and the company of men that call in question or discuss it, and regards as impious those questions which cannot easily be asked without disturbing it"

Inverse: "If a man who isn't holding a belief which he was taught in childhood or persuaded of afterwards, keeps down and pushes away any doubts which arise about it in his mind, purposely avoids the reading of books and the company of men that call in question or discuss it, and regards as impious those questions which cannot easily be asked without disturbing it - the life of that man isn't one long sin against mankind."

Contrapositive: "If he life of that man isn't one long sin against mankind, then   a man who isn't holding a belief which he was taught in childhood or persuaded of afterwards, keeps down and pushes away any doubts which arise about it in his mind, purposely avoids the reading of books and the company of men that call in question or discuss it, and regards as impious those questions which cannot easily be asked without disturbing it."

Non-conditional-form negation: "it is not the case that if a man, holding belief which he was taught in childhood or persuaded of afterwards, keeps down and pushes away any doubts which arise about it in his mind, purposely avoids the reading of books and the company of men that call in question or discuss it, and regards as impious those questions which cannot easily be asked without disturbing it - the life of that man is one long sin against mankind."

b. "If existing agricultural knowledge were everywhere applied, the planet could feed twice its present population."

The Lessons of History (1968) by Will and Ariel Durant.

Converse: "If the planet could feed twice its present population, then existing agricultural knowledge were everywhere applied."

Inverse: "If existing agricultural knowledge weren't everywhere applied, the planet couldn't feed twice its present population."

Contrapositive: "If the planet couldn't feed twice its present population, then existing agricultural knowledge weren't everywhere applied."

Non-conditional-form negation: "It is not the case that if existing agricultural knowledge were everywhere applied, the planet could feed twice its present population."

c. "But even if the initial colonists had consisted of only 100 people and their numbers had increased at a rate of only 1.1 percent per year, the colonists's descendants would have reached that population ceiling of 10 million people within a thousand years."

Guns, Germs, and Steel (1997) by Jared Diamond.

Converse: "But even if the colonists' descendants would have reached that population ceiling of 10 million people within a thousand years, then the initial colonists had consisted of only 100 people and their numbers had increased at a rate of only 1.1 percent per year."

Inverse: "But even if the initial colonists hadn't consisted of only 100 people and their numbers had increased at a rate of only 1.1 percent per year,the colonists' descendants wouldn't have reached that population ceiling of 10 million people within a thousand years."

Contrapositive: "But even if the colonists' descendants wouldn't have reached that population ceiling of 10 million people within a thousand years,

then the initial colonists hadn't consisted of only 100 people and their numbers had increased at a rate of only 1.1 percent per year."

Non-conditional-form negation: "But even if the initial colonists had consisted of only 100 people and their numbers had increased at a rate of only 1.1 percent per year and the colonists' descendants wouldn't have reached that population ceiling of 10 million people within a thousand years."

d. "If anyone looked out of their window now, even beady-eyed Mrs. Dursley, they wouldn't be able to see anything that was happening down on the pavement."

Harry Potter and the Philosopher's Stone (1997) by J. K. Rowling

Converse: "If they wouldn't be able to see anything that was happening down on the pavement, then anyone looked out of their window now, even beady-eyed Mrs. Dursley."

Inverse: "If anyone don't look out of their window now, even beady-eyed Mrs. Dursley, they would be able to see anything that was happening down on the pavement."

Contrapositive: "If they would be able to see anything that was happening down on the pavement, then anyone don't look out of their window now, even beady-eyed Mrs. Dursley."

Non-conditional-form negation: "It is not the case that if anyone looked out of their window now, even beady-eyed Mrs. Dursley, they wouldn't be able to see anything that was happening down on the pavement."

2.1.3 Problem 3

Fallacies: Converse Error

> If my car has some problems, then I cannot get to trip.
>
> I cannot get to trip.
>
> - My car has some problems.

Fallacies: Inverse Error

> If he live in SGN, then he is a rich.
>
> He don't live SGN.
>
> - He isn't a rich.

Fallacies: A Valid Argument with a False Premise and a False Conclusion

> If the SGN is a big city, then The population get below of 10 millions.
>
> The SGN is a big city.
>
> - The population get below of 10 millions.

Fallacies: An Invalid Argument with True Premises and a True Conclusion

> If tomorrow is my birthday, then today is 10st.
>
> Today is 11st.
>
> - Tomorrow is my birthday.

2.2 Part 2

2.2.1 Problem 4

a) 520H0418, therefore, 0418 % 7 = 5 then change the item at E5 into a red circle.

New Tarski's world.

	1	2	3	4	5	6	7	8	9
A		▲						●	
B									
C		▲		●			■		●
D		●	■					▲	
E				▲	●	■			
F	■								
G							■		
H		●			▲				
I	●								

b)

i. ∀x, Circle(x) → Green(x).

Answer: It's false because the circle at E5 is red color.

ii. ∀x, Triangle(x) → ~Orange(x).

Answer: It's true because all triangle are not orange color.

iii. ∃x such that Red(x) ∧ Triangle(x).

Answer: It's true because the triangle at E4 is red color.

iv. ∃x such that ~Green(x) ∧ BelowOf(x, E4).

Answer: It's true because all X below of E4 aren't green color.

v. ∀x, Square(x) → RightOf(E5, x).

Answer: It's false because E6 is the square which is to the right of E5.

vi. ∃x such that AboveOf(E5, x) ∧ LeftOf(x, E5).

Answer: It's true because F1 is to the below of E5 and to the left of E5.

vii. There is a triangle x such that for all squares y, x is above y.

Answer: It's true because the triangle at A2 is to the above of all square.

viii. For all circles x, there is a square y such that y is to the right of x.

Answer: It's False because the circle at E5 is to the right of square which is D3.

ix. There is a circle x and there is a square y such that y is below x.

Answer: It's true because the square at F1 is to the below of the circle at D2.

x. For all circles x and for all triangles y, x and y have the same color.

Answer: It's false because the circle at H2 is an orange color but the triangle at H5 is a red color.Therefore, both of it don't have the same color.

2.2.2 Problem 5

0418 % 2 = 0 therefore, statements a, d, f, g

a. It is windy but it isn't raining.

Answer: p∧~r

d. Windiness is a necessary condition for rain.

Answer: ~p->~r

f. Whenever it is lightning, it will be thundering.

Answer: s->q

g. The necessary and sufficient condition for thundering is lightning.

Answer: s<->q

2.2.3 Problem 6

520H0418 has 0418 % 3 = 1.

- ~ [(~ p ∨ q) ∨ ~ (p ∧ ~ (p ∨ q))] ≡ p ∧ ~ (p ∨ q)
  (i). The truth table:

Table (2.2.3.1) Left Equivalence.

p	q	p∨q	~(p∨q)	p ∧~(p∨q)	~(p∧ ~ (p ∨ q))	~p∨q	(~ p ∨ q) ∨ ~ (p ∧ ~ (p ∨ q))
T	T	T	F	F	T	T	T
T	F	T	F	F	T	F	T
F	T	T	F	F	T	T	T
F	F	F	T	F	T	T	T

~ [(~ p ∨ q) ∨ ~ (p ∧ ~ (p ∨ q))]
F
F
F
F

Table (2.2.3.2) Right Equivalence.

p	q	p∨q	~(p∨q)	p ∧~(p∨q)
T	T	T	F	F
T	F	T	F	F
F	T	T	F	F
F	F	F	T	F

(ii). Logical equivalence laws:

$\sim [(\sim p \vee q) \vee \sim (p \wedge \sim (p \vee q))]$

$= \sim(\sim p \vee q) \wedge \sim(\sim(p \wedge \sim (p \vee q)))$ (by De Morgan's Laws)

$= \sim(\sim p \vee q) \wedge (p \wedge \sim (p \vee q))$ (by double negative laws)

$= p \wedge \sim q \wedge p \wedge \sim p \wedge \sim q$ (by De Morgan's Laws)

$= p \wedge \sim q \wedge \sim p$ (by Idempotent Laws)

$= p \wedge \sim(p \vee q)$ (by Associative Laws)

$\equiv p \wedge \sim (p \vee q)$

TÀI LIỆU THAM KHẢO

Tiếng Anh

1. Courtney Taylor. (2019), date of access: 15-11-2021, link: What Is a Converse Error Fallacy? (thoughtco.com).

2. Paul Elsher, date of access: 15-11-2021, link: The Formal Fallacy of Denying the Antecedent – Fallacy In Logic.

3. Csuohio, date of access: 15-11-2021, link: Valid (false premises, false conclusion) (csuohio.edu).

4. Geoffrey Klempner, date of access: 15-11-2021, link: Invalid argument with true premisses and true conclusion – Ask a Philosopher .

PHỤ LỤC

Problem 1: Password.

Problem 2: Conditional Statements.

Problem 3: Fallacies.

Problem 4: Tarski's world

Problem 5: Symbolic Form.

Problem 6: Equivalence .