上海交通大学在线考试诚信承诺书

SJTU Online Examination Honor Code Letter

考试不仅是对学习成效的检查，更是对道德品质的检验。自觉维护学校的考风考纪，营造公平、公正的考试环境是全体同学的共同责任和义务。特别在疫情防控的特殊时期，更应强化自律意识，恪守诚信，拒绝舞弊，做一名诚实守信的新时代大学生，用诚信的考试构筑诚信的人生。

Examination is the evaluation of both learning effect and morality. It is the responsibility and obligation of all students to consciously maintain the school's common examination practice, abide by the discipline and create a fair and just examination environment. Especially in the special period of epidemic prevention and control, we should strengthen the consciousness of self-discipline, abide by the integrity, refuse to cheat, be an honest and trustworthy college student in the new era, and build an honest life from the integrity test.

我郑重承诺 I solemnly promise:

（1）本人将履约践诺，知行统一；遵从诚信规范，恪守学术道德；自尊自爱，自省自律。I will fulfill my promise, unify between knowledge and action, abide by the rules of integrity, academic ethics, be self-respected and self-disciplined.

（2）在线考试过程中，自觉遵守学校和老师宣布的考试纪律（详见《上海交通大学本科生学生手册》中的《学生考试纪律规定》，沪交教【2019】28 号），不剽窃，不违纪，不作弊。In the process of online examination, I will consciously abide by the examination discipline announced by the school and the teachers (see the regulations on student examination discipline in the undergraduate student handbook of Shanghai Jiao Tong University, HJJ [2019] No. 28), and do not plagiarize, violate discipline or cheat.

（3）若违反相关考试规定和纪律要求，自愿接受学校的严肃处理或处分。In case of violation of relevant examination regulations and discipline, students shall bear the serious treatment or punishment from the school.

承诺人 Committed by: 钱翔云

（学号 Student No: 520030910366 ）

日期 Date (Y/M/D): 2023年 1月 5日

上 海 交 通 大 学 答 题 纸

（ 20__ 至 20____ 学年 第____学期 ）

班级号 F2003802　　学号 520030910366　　姓名 钱翔云

课程名称 数理逻辑　　成绩 ______

我承诺，我将严格遵守考试纪律。

承诺人：钱翔云

题号										
得分										
批阅人(流水阅卷教师签名处)										

一、1. C 2. B 3. C 4. D 5. D 6. A 7. A 8. C 9. B 10. B

二、1. infinite.

2. $(\neg A\wedge B\wedge\neg C)\vee(\neg A\wedge\neg B\wedge C)$

3. $\neg z$

4. $\exists x(Px\rightarrow\forall y\ \neg(Qy\wedge\neg Ry))$

5. z, x

6. $\exists x\ x\dot{\times}x\dot{=}1\dot{+}1$

7. b

8. $\forall x\forall y\forall z(\neg x\dot{=}y\wedge\neg y\dot{=}z\rightarrow x\dot{=}z)$

9. $v_1\dot{\times}v_1<v_1$

10. $\neg\alpha$ is a tautology.

三、(1) ∵ $Q\subseteq\mathbb{N}\times\mathbb{N}$ is effectively enumerble

∴ ∃ an algorithm A listing Q, and rng(Q) is effectively enumerble.

Then we can construct the following algorithm B:

```
for i:=1,2,3 ....:     < Initial S as ∅
    if i==1:
        start A
    else:
        run A from i-1 th iteration.
    if A has output now:
        a, b = output.
        ~~print a~~
        if a not in S:
            print a
            S ← S∪{a}
        ~~else~~
    else: continue.
```

because A is the algorithm that can effectively list Q. Obviously B can effectively list. P without repetition. Therefore, P is effectively enuerable.

三(2) 见下页

上 海 交 通 大 学 答 题 纸

（ 20__ 至 20____ 学年 第____学期 ）

课程名称 ______________________ 姓名 钱翔云

三 (2). Suppose algorithm C and D ~~are~~ can effectively list A and B.
Then we construct the following algorithm:

Initial A_s, B_s, D as ϕ
for i=1,2 ......:
  run algorithm C and D for one iteration. get a output.
  A_o, B_o = output. ~~A_o~~
  If A_o in B_s and not in D: ~~and A_o not in D~~
    print A_o
    D ← D ∪ {A_o}
    A_s ← A_s ∪ {A_o}
  If B_o in A_s and B_o not in D:
    print B_o
    D ← D ∪ {B_o}.
    B_s ← B_s ∪ {B_o}
  ~~A_o~~
  ~~A_s ← A_s ∪ {A_o}~~
  ~~B_s ← B_s ∪ {B_o}~~

Obviously the above algorithm can effectively ~~enumerate~~ list A∧B without repetition. Because if A_o in B_s will output in first order and B_o will output in second order. if they not in D (避免出现重复).
Therefore, A∧B is effectively enumerable.

上 海 交 通 大 学 答 题 纸

(20__ 至 20___ 学年 第___学期)

课程名称 ______________________ 姓名 钱翔耘

四 (1). $\Sigma \models \alpha$

$\Leftrightarrow$ ~~if a~~ for any truth assignment v if v s.t. Σ, then v s.t α.

$\Leftrightarrow$ for any truth assignment v if v s.t λ for all $\lambda \in \Sigma$, then v s.t α.

② for any truth assignment v, if v s.t $\Sigma \cup \Delta$, which means:

1. v satisfies all wffs $\lambda \in \Sigma \cup \Delta$. ($v$ s.t all wffs $\lambda \in \Sigma$) 又∵ $\Sigma \models \alpha$.

∴ v satisfies α. $\Rightarrow \Sigma \cup \Delta \models \alpha$.

2. v satisfies all wffs $\lambda \in \Sigma \cup \Delta$ (v s.t all wffs $\lambda \in \Delta$)

又∵ from 1 we know v s.t α.

∴ v s.t $\Delta \cup \{\alpha\}$ 又∵ $\Delta \cup \{\alpha\} \models \beta$

∴ v s.t β. $\Rightarrow \Sigma \cup \Delta \models \beta$.

Therefore, if $\Sigma \models \alpha$ and $\Delta \cup \{\alpha\} \models \beta$, then $\Sigma \cup \Delta \models \beta$.

(2).

$$
\dfrac{\{\beta \vee \neg\beta\} \quad \dfrac{\{\alpha \vee \beta\} \quad \dfrac{[\alpha]}{\alpha \vee \gamma}\,\vee\text{-I}_1 \quad \dfrac{[\beta]\ [\neg\beta]}{\alpha \vee \gamma}\,\neg\text{-E}}{\alpha \vee \gamma}\,\vee\text{-E} \quad \dfrac{\{\gamma \vee \neg\beta\} \quad \dfrac{[\gamma]}{\alpha \vee \gamma}\,\vee\text{-I}_2 \quad \dfrac{[\neg\beta]\ [\beta]}{\alpha \vee \gamma}\,\neg\text{-E}}{\alpha \vee \gamma}\,\vee\text{-E}}{\alpha \vee \cancel{\beta}\,\gamma}\,\vee\text{-E}
$$

上 海 交 通 大 学 答 题 纸

(20_ 至 20___ 学年 第___学期)

课程名称 ____________________ 姓名 饶翔云

五(1). $\exists x Px \to Qx$

<=> ~~若~~ There exists x, ~~若~~ if Px then Qx. (*)

$\forall x (Px \to \exists y Qy)$.

<=> for any x, if Px then $\exists y Qy$

<=> for any x, if Px, then there exists y, Qy.

from * we know There exists x, if Px then Qx

<=> if There exists x ~~若~~ Px then there exists x Qx

<=> if there exists x Px then there exists y Qy

<=> $\exists x Px \to \exists y Qy$.

from above we know, if x Px, then. $\exists y Qy$.

Therefore, $\forall x (Px \to \exists y Qy)$ holds.

(2) a. {1} is definable with. $\forall v_2\ v_2 \dot{\times} v_1 \doteq v_2$.

b. mark a's formula as φ, replace v_1 in φ as x, and read $\varphi(x)$.

Then we can define {2} with $\forall v_2\ \varphi(v_2) \wedge (v_1 \dot{\times} v_1 \doteq v_2 \dot{+} v_2)$

上 海 交 通 大 学 答 题 纸

（ 20__ 至 20____ 学年 第____学期 ）

课程名称 ______________________ 姓名 钱翔云

五 (3). ~~I think~~ Suppose h as the homomorphism function. ~~$h(n) = \begin{cases} 2n-1, & n>0 \\ 0, & n=0 \\ -2n, & n<0 \end{cases}$~~

~~1. $h(\hat{0}) = 0 = 0^3\ 0 = 0^3$~~

~~$h(\hat{1}) = 1 = 1^3\ 2\cdot 1 - 1 = 1 = 0\ 1^3$~~

~~2. $h(a \hat{+} b) = \{\ h(a) +^3 h(b) =$~~

$h(n) = n$. $\quad h(\hat{+}) = +^3 \quad h(\hat{x}) = x^3$

1. $h(\hat{0}) = h(0) = 0 = 0^3$

$h(\hat{1}) = 1 = 1^3$.

2. $h(a \hat{+} b) = h(a) +^3 h(b) = a +^3 b = a+b = h((a \hat{+} b)) = h(a+b) = a+b$.

$h(a \hat{\times} b) = h(a) \times^3 h(b) = a \times^3 b = a \times b$ ~~$h((a \hat{\times} b))$~~

$h((a \hat{\times} b)) = h(a \times b) = a \times b$

~~矣. 不要~~

∵ hormorphism doesn't require surjective.

∴ $h(n)$ s.t the requirement of hormorphism

上海交通大学试卷（草稿纸）

（20__ 至 20____ 学年 第____学期）

课程名称 ____________ 姓名 [illegible]

4. If sure is play video ~, the no one is.

$\exists x\ Px \rightarrow \neg(\forall y\ Qy \vee Ry)$?

$(\alpha \rightarrow (\beta \wedge \alpha))$

$(\alpha \rightarrow \beta)$

infinite

2. $\cancel{A}$ B ∨ D
3. $\cancel{B}$ B ∨ D
4. D B y D
5. D B y D
6. [illegible]
7. [illegible]
8. [illegible]
9. [illegible]

10. [illegible]

11. [illegible]

F ¬F. ¬T F. T

12. $\neg((B \leftrightarrow \neg C) \rightarrow A)$

A	B	C		
T	T	T	F	
T	T	F	F	
T	F	T	F	
T	F	F	F	
F	T	T	T	
F	T	F	T	
F	F	T	T	
F	F	F	F	

$\forall V_2.\ V_1 \times V_1$

not provable.

α is pr, tautology

$\neg\alpha$.

$\varphi(V_2) \wedge (V_1 \times V_1 \doteq V_2 + V_2)$.

$V_1 \dot{\times} V_1 < V_1$

$\forall x\ \overline{A} \times \overline{A}$

$\forall x \forall y \forall x$

$S_1\ (y|b)(x|a)(z|c)$

$S_2\ (x|b)(z|c)(x)$

$\{\beta \vee \neg\beta\}$

$[\beta]$

$\dfrac{\alpha \vee \beta}{\alpha \vee y}$

$= 1+1$

$\dfrac{\alpha \vee y}{\alpha \vee y}\ \alpha \vee y$

$\overline{\alpha \vee y}$.

$2n+1$

$2n-1$

$n/2 = 0$

$n/2$

$\frac{n+1}{2}$