Mittuniversitetet
MID SWEDEN UNIVERSITY

Final exam

LT001A Writing exams in LaTeX

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Instructions

Carefully read the questions before you start answering them. Note the time limit of the exam and plan your answers accordingly. Only answer the question, do not write about subjects remotely related to the question.

Write your answers on separate sheets, not on the exam paper. Only write on one side of the sheets. Start each question on a new sheet.

Make sure you write your answers clearly, if I cannot read an answer the answer will be awarded no points – even if the answer is correct. The questions are *not* sorted by difficulty.

Time 5 hours, no breaks.

Aids None.

Maximum points 37

Questions 9

Bonus points

There are no bonus points ...

Preliminary grades

The following grading criteria applies: E $\geq$ 50%, D $\geq$ 60%, C $\geq$ 70%, B $\geq$ 80%, A $\geq$ 90%; with no question awarded zero points.

Questions

(4p) 1. What is the best way to learn how to write exams in LaTeX? Select all that applies.

A. To write the exams using Microsoft Word.

B. To study the source.

C. To read a text describing it.

D. To generate it using the upcoming exam generation system.

(2p) 2. What does the following Python[1] program do?

```
1 print("Hello␣" + input("What␣is␣your␣name?␣") + "!")
```

Lösningsförslag Running the program yields the following output:

```
1 $ /usr/bin/python3.2
2 Python 3.2.2 (default, Sep  5 2011, 21:17:14)
3 [GCC 4.6.1] on linux2
4 Type "help", "copyright", "credits" or "license" for more information.
5 >>> print("Hello " + input("What is your name? ") + "!")
6 What is your name? Daniel
7 Hello Daniel!
8 >>>
9 $
```

3. Answer the following questions in units of Mbit/s.

(1p) (a) How fast a connection do you need to transfer a 1 GB file in less than 30 s.

(1p) (b) How fast a connection do you have if you can download a 1 GiB file in 30 s.

(1p) 4. Every time I boot my computer, I find that I lack some command. What operating system am I using then? **A. Windows** B. Linux C. BSD

5. Would you say that

(1p) (a) fråga 4 is impartial?

Lösningsförslag No. There are things missing in the UNIX-like world as well, like the Blue Screen of Death and the simplicity of having only one command to solve all problems – `format c:`.

(1p) (b) fråga 1 is impartial?

Lösningsförslag Yes, very.

(10p) 6. Look at figur 1 på sidan 4. Describe the differences between 1(a) and 1(b) in exactly 2002 words, i.e. about five (5) pages.

Lösningsförslag Should a student nail your exam, that is not a sign of how well the student has done on the course but rather of how poorly you constructed your exam. To avoid such embarrassments this type of question is useful.

[1] Python version 3.

(10p) 7. Use tabell 1 på nästa sida to encrypt *all* of your answers in this entire exam.

Lösningsförslag

```
UKPEG VJKU KU CP CPUYGT VQ C SWGUVKQP, UJQWNF VJKU DG GPETARVGF
TGEWTUKXGNA?
```

(2p) 8. Prove whether there exists a solution to ekvation (1).

$$\sum_{n=0}^{\infty} \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}^{-1} n^{p-1} \equiv x \pmod{p}, \tag{1}$$

where p is a prime.

Lösningsförslag This is trivial. Look it up in the course literature.

(2p) 9. Analyse algoritm 1 på nästa sida.

(1p) (a) Reason about whether this is an algorithm or not.

Lösningsförslag After a not so heated discussion where all participants immediately agreed, this is not an algorithm – it does not necessarily end, thus being disqualified as an algorithm.

(1p) (b) Improve it!

Lösningsförslag Allow at most three fails, now it qualifies as an algorithm.

If you are insensible to sarcasm, please know there has been a lot of it in this so called exam.

Sincerely,
the authors.

(a) CMYK, PDF (b) sv, PDF

Figur 1: The university logotypes.

a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
p	q	r	s	t	u	v	w	x	y	z	å	ä	ö	
R	S	T	U	V	W	X	Y	Z	Å	Ä	Ö	A	B	

Tabell 1: Table used for encryption and decryption in the Caesar cipher.

indata some input
utdata some output

medan Student has not passed **genomför**
    Read hand-in
    om Not sufficient **då** Fail student
    annarsPass student
    slut om
slut medan

Algoritm 1: An algorithm for student assessment.