DSV Institutionen för Data-
och Systemvetenskap

STOCKHOLMS UNIVERSITET

KUNGLIGA TEKNISKA HÖGSKOLAN

***:96 (SU) and 2I1263 (KTH)
Internet Application Protocols
and Standards**

Exam-2004-10-22-solved

The following documents are allowed during the exam:

1. Documents in Compendium 1, printed on colored paper.

2. Documents in Compendium 2, printed on colored paper.

3. Documents in Compendium 3, printed on colored paper.

4. Documents in Compendium 7, printed on colored paper.

5. Documents in Compendium 9, printed on colored paper.

6. Ordinary language dictionaries between English and Swedish.

Note 1: Compendium 4, 5, 6 and 8 are not allowed during the exam. The exam supervisor will check that you do not have copies of compendiums 4 ,5 ,6 and 8 printed on color paper. Bringing such compendiums on colored paper is cheating and can result in suspension of your rights to study.

Note 2: Underscoring and short handwritten notes in the yellow documents are allowed.

Note 3: A few copies of these compendiums (part 1-3, 7 and 9) will be available for loan during the exam for students who have not bought the compendiums.

Important warning

It is not acceptable to answer an exam question by just a verbatim quote from the allowed documents above. You must show that you understand the question and your answer by using your own words.

Jacob Palme will come to the exam rooms around 16:00 o'clock to answer questions regarding unclear exam tasks.

No.	Question in English	Question in Swedish	Max points
1	The specification for the "Date" e-mail header in the old e-mail format standard, RFC 822 is shown below. Compare this with the new standard RFC 2822 and in particular look at where white space is allowed.	Nedan visas specifikation för epost-huvudfältet "Date" i den gamla standarden RFC 822. Jämför detta med den nya standarden RFC 2822, speciellt ifråga om var mellanslag (blanksteg) tillåts.	6

```
orig-date   =  "Date"          ":"   date-time

date-time   =  [ day "," ] date time        ; dd mm yy

date        =  1*2DIGIT month 2DIGIT   ; day month year
                                       ;  e.g. 20 Jun
month       =  "Jan"  /  "Feb" /  "Mar"  /   "Apr"
               /   "May"   /  "Jun" /  "Jul"  /   "Aug"
               /   "Sep"   /  "Oct" /  "Nov"  /   "Dec"
day         =  "Mon"  / "Tue" / "Wed"  / "Thu"
               /  "Fri"  / "Sat" /  "Sun"
time        =  hour zone                ; ANSI and Military

zone        =  "UT"  / "GMT"            ; Universal Time
                                       ; North American :
UT
               /  "EST" / "EDT"         ;  Eastern:  - 5/ -
4
               /  "CST" / "CDT"         ;  Central:  - 6/ -
5
               /  "MST" / "MDT"         ;  Mountain: - 7/ -
6
               /  "PST" / "PDT"         ;  Pacific:  - 8/ -
7
               /  1ALPHA               ; Military: Z = UT;

hour        =  2DIGIT ":" 2DIGIT [":" 2DIGIT]
```

No.	Question in English	Question in Swedish	Max points

Answer:

The corrersponding code in RFC2822 is:

```
orig-date     =     "Date:" date-time CRLF
date-time     =     [ day-of-week "," ] date FWS time [CFWS]
day-of-week   =     ([FWS] day-name) / obs-day-of-week
day-name      =     "Mon" / "Tue" / "Wed" / "Thu" /
                    "Fri" / "Sat" / "Sun"
date          =     day month year
year          =     4*DIGIT / obs-year
month         =     (FWS month-name FWS) / obs-month
month-name    =     "Jan" / "Feb" / "Mar" / "Apr" /
                    "May" / "Jun" / "Jul" / "Aug" /
                    "Sep" / "Oct" / "Nov" / "Dec"
day           =     ([FWS] 1*2DIGIT) / obs-day
time          =     time-of-day FWS zone
time-of-day   =     hour ":" minute [ ":" second ]
hour          =     2DIGIT / obs-hour
minute        =     2DIGIT / obs-minute
second        =     2DIGIT / obs-second
zone          =     (( "+" / "-" ) 4DIGIT) / obs-zone
```

Major functional differences between RFC822 and RFC2882 for the Date header:

1. The RFC2822 contains a number of syntactical unit whose name begins with "obs-". These are variants which should be allowed in input, but not produced in newly created encodings (1). For example, two-digit years are allowed in input but should not be produced, and use of alphabetic time zone names is discouraged in RFC2822.

2. The RFC2822 specifications contains in several places CFWS anc FWS which indicate places where white space is allowed. FWS (1) includes space, horizontal tab, and newline, provided that the next line begins with a white space character. CFWS (1) includes FWS plus comments in parenthesises. Systems based on RFC822 actually allow white space (1) in these places, but the specification does not describe this. For example, it is now clear that no space is allowed between "Date" and ":", but that space is allowed after "Date:". RFC2822 specifies that FWS is allowed in the following places:

   a. Between date and time. (0.25)
   b. Before and after month name. (0.25)
   c. Before day. (0.25)
   d. Between time and zone. (0.25)

RFC2822 also specifies that CFWS is allowed, but only at the end of all other data. The "obs-"format allows CFWS in many additional places. (1)

No.	Question in English	Question in Swedish	Max points
2	Given the two ASN.1 type declarations:	Givet de två ASN.1 typdeklarationerna:	6

Bike ::= SEQUENCE {
 no-of-wheels Integer,
 weight REAL }
Motorcar ::= SEQUENCE {
 horsepower REAL,
 weight REAL }

Make an ASN.1 declaration for a type Vehicle which can be either a Bike or a Motorocar.

Bike ::= SEQUENCE {
 no-of-wheels Integer,
 weight REAL }
Motorcar ::= SEQUENCE {
 horsepower REAL,
 weight REAL }

Ange en ASN.1 deklaration for en typ Vehicle som kan användas för antingen en cykel eller en bil.

Alternative answer 1:

Vehicle ::= CHOICE { [0] Bike, [1] Motorcar }

Alternative answer 2:

Vehicle ::= CHOICE { Bike, [0] Motorcar }

Alternative answer 3:

TaggedBike ::= [0] Bike
TaggedMotorCar ::0 [1] Motorcar
Vehicle ::= CHOICE { TaggedBike, TaggedMotorcar }

Incorrect answer (The elements of CHOICE must be of distinct type, and Bike and Motorcar both have the same type SEQUENCE.):

Vehicle ::= CHOICE { Bike, Motorcar }

No.	Question in English	Question in Swedish	Max points
3	In compendium 5A page 53 is the following example of a definition of A PICS grading system Do a similar specification using XML. DTD need not be specified.	I kompendium 5A sid 53 finns följande exempel av en definition av ett PICS grading system. Gör en motsvarande specifikation med XML. DTD behöver inte anges.	6

```
PICS-version 1.1)
(rating-system "http://MPAAscale.org/Ratings/Description/")
(rating-service "http://MPAAscale.org/v1.0")
(icon "icons/MPAAscale.gif")
(name "The MPAA's Movie-rating Service")
(description "A rating service based on the MPAA's movie-rating scale")
(category
(transmit-as "r")
(name "Rating")
(label (name "G") (value 0) (icon "icons/G.gif"))
(label (name "PG") (value 1) (icon "icons/PG.gif"))
(label (name "PG-13") (value 2) (icon "icons/PG-13.gif"))
(label (name "R") (value 3) (icon "icons/R.gif"))
(label (name "NC-17") (value 4) (icon "icons/NC-17.gif"))))
```

Figure 4: A PICS-compatible description of a service that is based on the MPAA movie rating scheme.

No.	Question in English	Question in Swedish	Max points

Answer:

Note 1: The first three lines below were not required for full points on this task.

Note 2: I have chosen a solution with use of attributes very much. It is of course possible to use subelements instead of attributes for many of the attributes.

```
<?xml version="1.0" ?>
<!DOCTYPE pics SYSTEM "http://www.dsv.su.se/jpalme/internet-
course/xml/pics.dtd">
<pics
  rating-system="http://MPAAscale.org/Ratings/Description/"
  rating-service="http://MPAAscale.org/v1.0"
  icon="icons/MPAAscale.gif"
  name="The MPAA's Movie-rating Service"
<description>
A rating service based on the MPAA's movie-rating scale
</description>
<category
  transmit-as="r"name="Rating"
<label name="G" value="0"icon="icons/G.gif" />
<label name="PG"value="1"icon="icons/PG.gif">
<label name="PG-13"value="2"icon="icons/PG-13.gif">
<label name="R"value="3" icon="icons/R.gif">
<label name="NC-17"value="4"icon="icons/NC-17.gif">
</category>
</pics>
```

Note: Some student misunderstood the question, and specified DTD instead of XML. I have given 4 points to those who did this, and specified a fully correct DTD, like for example:

```
<!ELEMENT pics (description,category+)>
<!ATTLIST pics
  rating-system CDATA #REQUIRED
  rating-service CDATA #REQUIRED
  icon CDATA #REQUIRED
  name CDATA #REQUIRED
>
<!ELEMENT description (#PCDATA)>
<!ELEMENT category (label+)>
<!ATTLIST category
  transmit-as CDATA #REQUIRED
  name CDATA #REQUIRED
>
<!ELEMENT label EMPTY>
<!ATTLIST label
  name CDATA #REQUIRED
  value CDATA #REQUIRED
  icon CDATA #REQUIRED
>
```

No.	Question in English	Question in Swedish	Max points
4	Specify an extension to HTTP to allow the grading of the readability of a web page.	Specificera en utvidgning av HTTP som gör det möjligt att informera om hur lätt det är att läsa en webbsida.	6

Answer:

```
The Readability header indicates the readability of the web
page being delivered.
```

```
Readability = "Readability:" qvalue
```

Note 1: Since the HTTP standard uses ABNF, extensions to it should be specified using ABNF. And since the HTTP standard already has a syntatical construct for quality value scales, "qvalue", it is neatest to use this instead of inventing a new scale. It is often better to use existing code than defining new. (See the HTTP 1.1 specification chapter "3.9 Quality Values".)

Note 2: Some students interpreted the question to mean a way for a client to send a readability evaluation of a web page to a server. Since this is a possible interpretation of the questions, such answers were accepted as alternative correct answers to the question, and got full score if they were fully complete.