

Please write readably and answer in English.

There are three classes of questions: (a) expecting (relatively) short answers, (b) expecting more elaborate answers, and (c) a small design task. The questions are marked accordingly.

Questions:

1. [6p, a] Which functions does RTCP provide?
2. [6p, b] a) Assume you receive an offer containing the following SDP message. What are the semantics of this offer?

```
v=0
o=jdoe 2890844526 2890842807 IN IP4 10.47.16.5
s=-
c=IN IP4 10.47.16.5/127
t=0 0
m=video 51372 RTP/SAVP 31
a=crypto:1 AES_CM_128_HMAC_SHA1_80\
    inline:d0RmdmcmVCspeEc3QGZiNWpVLFJhQX1cfHAWJSoj|2^20|1:32
m=audio 49170 RTP/SAVP 0
a=crypto:1 AES_CM_128_HMAC_SHA1_32 \
    inline:NzB4d1BINUAvLEw6UzF3WSJ+PSdFcGdUJShpX1Zj|2^20|1:32
a=crypto:2 AES_CM_128_HMAC_SHA1_80 \
    inline:udhf9843yiuhrfkuyf834yhkwhkjew3uhkjhdew8kjhwhkw|2^20|1:32
```

- b) How would you answer if you do not understand secure AVP?
  - c) Which SDP extension(s) could help making the call succeed nevertheless if the calling party would also be happy with non-secure media.
3. [6p, a] What is an RTSP DESCRIBE message used for?
  4. [6p, b] a) Explain how a SIP service provider can assert the identity inside a SIP message for one of its users to a remote party.  
b) How can the SIP service provider be sure about the identity?  
c) How can the remote party validate the assertion?
  5. [6p, b] a) Which three methods are used in SIP presence?  
b) Sketch the authorization of a presence request.  
c) How does the *watcher-info* event package assist presence authorization?
  6. [6p, a] What is a focus? When and how would it use a factory URI?
  7. [6p, a] Describe conceptually how *adaptive* media streaming using HTTP works.
  8. [12p, c] You want to design a new a peer-to-peer system for a VoD service where, e.g., set-top boxes could help reducing the load of the VoD streaming servers. (Because your system will be implemented in the set-top-boxes, NAT traversal and DRM are non-issues.)
    - a) Which components do you need? Where are they located? Which functions do the components provide? What kind of load distribution do you envision?
    - b) How would you realize control and media distribution? Which protocols do you use where and why? Do you need any new ones (if so, for which functions)? You may borrow from any of the protocols we discussed.
    - c) Can you foresee any limitations (e.g., peak loads, churn) in your system? Briefly explain one.

(Note: there are many possible solutions).