MIDTERM EXAM

NAME:

ACTIVITY 1

Please provide a definition for the following concepts in the context of RTP:

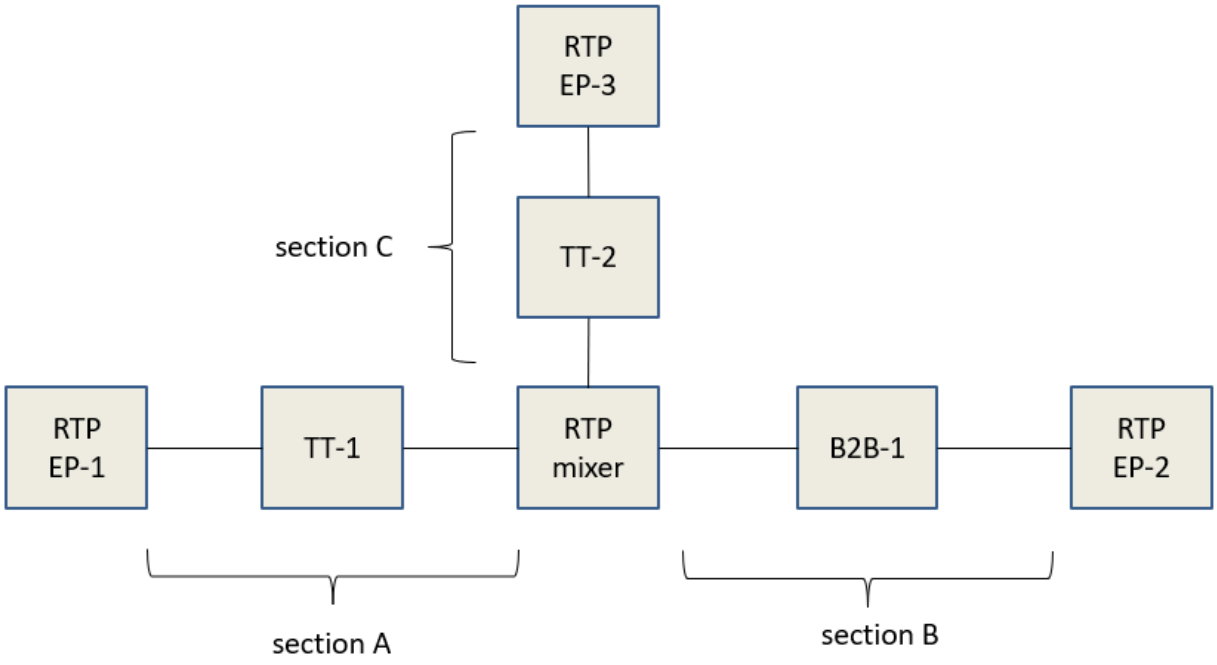
- RTP stream
- RTP session
- Media Transport
- Multimedia Session

The following RTP architecture represents a conferencing communication scenario where:

- TT = RTP Transport Translator
- B2B = RTP Back-to-Back
- EP = RTP Endpoint
- All the endpoints are transmitting and receiving 2 sources of video and one of audio
- All the elements in the architecture support multi-stream capability for audio

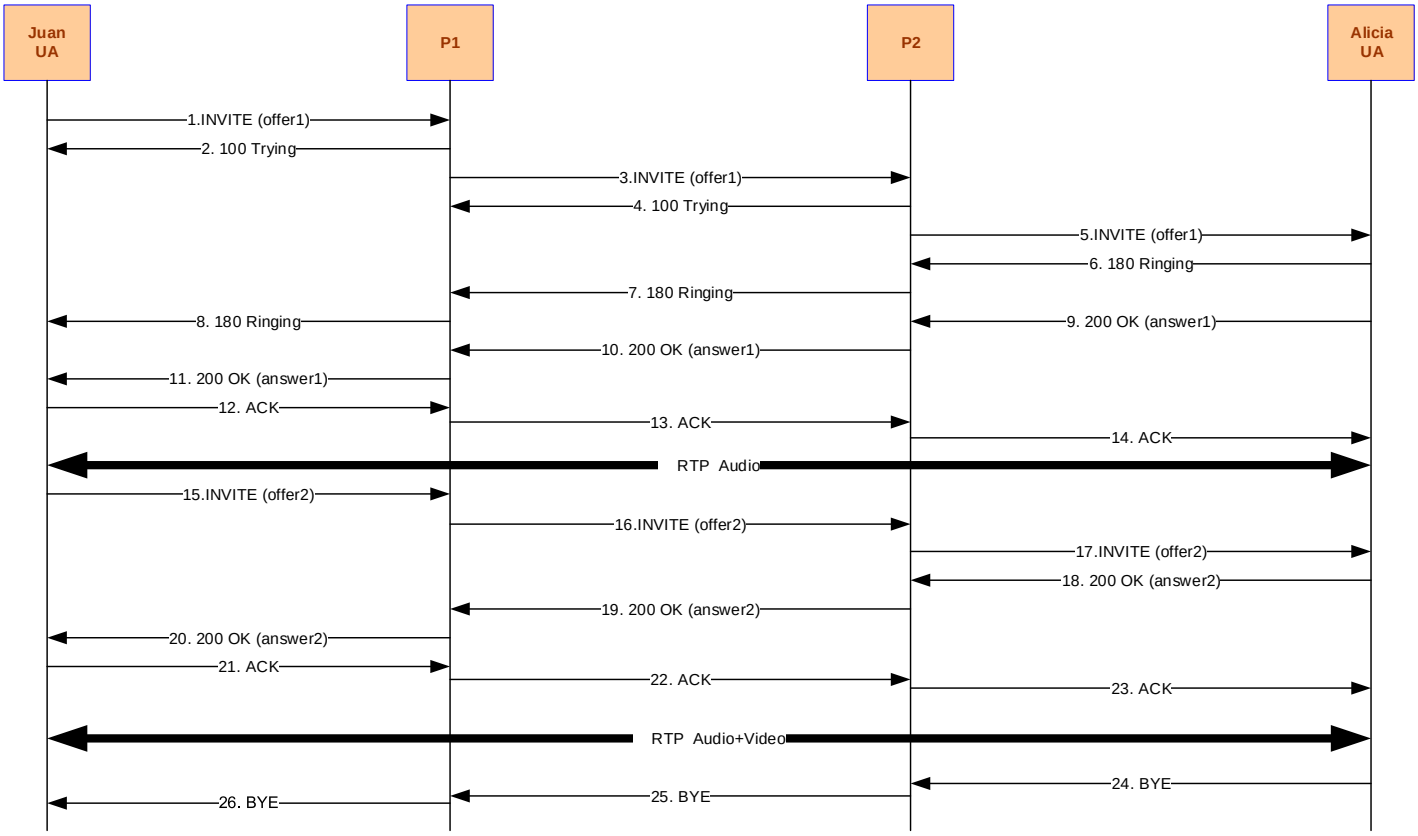
Please indicate, for each SECTION in the diagram:

- How many RTP streams, RTP sessions, Media Transports and Multimedia sessions there are.
- Provide a reasoning for your responses



ACTIVITY 2

The next figure shows the classic SIP trapezoid:



Given the following configuration data:

UA Juan	Address of Record	sip:juan@a.com
	SIP listening port	44444
	IP Address	192.168.1.2
UA Alicia	Address of Record	sip:alicia@b.com
	SIP listening port	55555
	IP Address	192.168.1.3
Proxy 1 (P1)	SIP URI	sip:proxy.a.com
	SIP listening port	5060
	Performs Record-Routing	yes
Proxy 2 (P2)	SIP URI	sip:proxy.b.com
	SIP listening port	5060
	Performs Record-Routing	yes

It is assumed that there is a DNS server, accesible from all the elements. It is requested to indicate the value of the following headers/elements:

SIP URI del Request-URI de step 5	
SIP URI del To header de step 5	
Record-Route de step 5	
Via de step 9	
SIP URI del From header de step 6	
Contact Header de 9	
From Header de step 13	
SIP URI del Request-URI de step 16	
Contact de 25	
SIP URI del From header de step 26	

ACTIVITY 4

Please, answer the following questions related to RTP:

(1) Let us asume that a RTP sender splits a coded video frame in 3 packets before sending it. If the previous frame timestamp contained an integer value of 25, which will be the RTP timestamp value of the third packet in the video frame? We assume that the frequency of the media clock at the sender is 90KHz and FPS=30.

(2) A RTP sender generates PCM coded audio at 16 bits per simple. How many octets does the RTP payload have if we asume that P=0 in the RTP header?
Information: In the SDP exchange, the offer included the following lines:
- ptime=40
- maxptime=40

(3) A host has two connected video cameras and two connected microphones. It is transmitting the respective signals towards another host in the Internet by using the RTP protocol. The host is using two RTP sessions, one for audio and another one for video.
- How many different synchronization sources exist?
- How does the RTP receiver know how to correlate the audio signals with the corresponding video signals in order to achieve lipsync?

(4) A RTP transmitter of PCM coded voice at 8-bit has received a RTCP RR packet with the following values: LSR=1200, DLSR=400. If the time as indicated by the media clock in the RTP transmitter when it receives the previous RTCP RR is 2000, which is the RTT in milliseconds?

ACTIVITY 5

Please answer the following questions related to SDP:

(1) Indicate if the following SDP exchange is correct or not. Why?.

offer

```
= 0
= - 2890844526 2890844526 IN IP4 host1.ocean.com
= -
= IN IP4 host1.ocean.com
= 0 0
```

answer

```
v = 0
o = - 2890877711 2890822211 IN IP4 host2.ocean.com
s = -
c = IN IP4 host2.ocean.com
t = 0 0
m = audio 42000 RTP/AVP 0
a = rtpmap:0 PCMU/8000
```

(2) Indicate if the following SDP exchange is correct or not. Why?

OFFER

```
v = 0
o = - 2890844526 2890844526 IN IP4 pc.ocean.com
s = -
c = IN IP4 host.ocean.com
t = 0 0
m = audio 49170 RTP/AVP 0
a = rtpmap:0 PCMU/8000
a=sendonly
```

ANSWER

```
v = 0
o = - 2890897755 2890899432 IN IP4 host.sea.com
s = -
c = IN IP4 host.sea.com
t = 0 0
m = audio 42000 RTP/AVP 0
a = rtpmap:0 PCMU/8000
a = inactive
```

(3) Indicate if the following SDP exchange is correct or not. Why?.

OFFER

```
v = 0
o = - 2890844526 2890844526 IN IP4 host.ocean.com
s = -
c = IN IP4 host.ocean.com
t = 0 0
m = audio 49170 RTP/AVP 0
a = rtpmap:0 PCMU/8000
m = video 51372 RTP/AVP 31
a = rtpmap:31 H261/90000
```

ANSWER

```
v = 0
o = - 2890897755 2890899432 IN IP4 host.sea.es
s = -
c = IN IP4 host.sea.es
t = 0 0
m = audio 42000 RTP/AVP 0 100
a = rtpmap:0 PCMU/8000
a = rtpmap:100 telephone-event/8000
```

(4) Given the following SDP offer generated by host A, which is the máximum data rate generated in the session?

```
v = 0
o = - 2890844526 2890844526 IN IP4 host.sea.es
s = -
c = IN IP4 host.ocean.com
t = 0 0
m = audio 49170 RTP/AVP 0
a = rtpmap:0 PCMU/8000
b = AS:64
b = RS:800
b = RR:2400
```