Exercise 1:
Establish a PPPoE connection between two notebooks. One notebook should be configured as PPPoE server and one as PPPoE client. The following configuration files may be helpful:

- /etc/ppp/pppoe.conf
- /etc/ppp/pppoe-server-options
- /etc/ppp/pap-secrets

Analyse in each step the generated traffic with wireshark. Which specific headers are added either for PPP and PPPoE? How the whole protocol stack of an average HTTP packet traveling over the PPPoE connection looks like?

1. Use the man pppoe-server command to learn the main options of the PPPoE server. Take a look at -m; -N; -I; -L; -R; -F etc.

2. Try to add a PPPoE server name with the option S name, and now try to connect with the servername.

Exercise 2:
Modify the /etc/ppp/pppoe-server-options, so that a connection with pap or chap is possible. Add two lines to the configuration file

- auth
- require-pap or require-chap

and specify a username and a password. Restart the PPPoE server and reconfigure your client. Is the username/password exchange seen in any packet captures?

Exercise 3:
PPPoE operates with dedicated serial links. Is the Address Resolution Protocol still needed (Why/not)?

Exercise 4:
Check the MTU of your different interfaces! What do you observe? Try to re-configure your PPPoE connection to a different MTU, e.g. of 1000 Bytes! Why would it be desirable to set a MTU of 1500 Bytes to your PPP interface too? Would it be possible to use the MTU of 1500 Bytes there (Why/not)?

Exercise 5:
Calculate roughly the overhead introduced by PPPoE compared to standard Ethernet connection taking ARP and PPP control protocols and headers into account!