4th Assignment Protocol Design WS 08/09

Question 1: (100 points) Simplified DNS client (part two)
(a) Now you should send the DNS request to a DNS server and parse the corresponding reply packet. This may contain arbitrary many answers in sections ANSWERS, AUTHORITIES and ADDITIONALs. The exact number is inserted in the corresponding header fields by the server. A single answer is encoded in a Resource Record (RR):

<table>
<thead>
<tr>
<th>multiple octets</th>
<th>16</th>
<th>16</th>
<th>32</th>
<th>16</th>
<th>multiple octets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Type</td>
<td>Class</td>
<td>TTL</td>
<td>Rddlength</td>
<td>Rdata</td>
</tr>
</tbody>
</table>

Details can be found in RFC 1035, Sec. 4.1.3. For now your program needs only support for answers with type A and class IN, other cases can be ignored. It is furthermore still sufficient to process only the first RR in the ANSWERS section; AUTHORITIES and ADDITIONALs can be ignored.

Your program must first parse the complete header of the answer packet, and print the individual fields to standard out. Errorcodes sent by the server must be treated properly and the program must terminate with a suitable error message.

Subsequently your program must output the QUESTIONS and ANSWERS sections, where you can assume exactly one question and one answer. The output format of your program should be roughly similar to the dig command.

An additional challenge is, that DNS uses a compression algorithm for names. For this part of the question you need not understand the compression algorithm. Just assume, that the Name field in the ANSWERS section is exactly two bytes long due to compression, and output the string compressed instead of the real DNS name.

Submit:

- The source code of your program
- The output of your program, if you query for www.heise.de. You can use 130.149.220.253 or 130.149.2.12 as nameserver.

(b) Extend your program to cope with compressed DNS names. A detailed explanation of the algorithm can be found in RFC 1035, Sec. 4.1.4.

Submit:

- The source code of your program
- The output of your program, if you query for www.heise.de.

(c) Add support for AUTHORITIES and ADDITIONALs. Add these sections to your program’s output. Add support for the types CNAME and NS. You can still assume exactly one RR in the QUESTIONS section. You output format should further on be roughly similar to dig.

Submit:

- The source code of your program
- The output of your program for www.heise.de and www.google.de.
(d) Extend your program with the option to perform iterative queries, and to deal with the related answers. Output all answer packets. The query should be done automatically, i.e., you should need to run your program only once to do a full iterative query.

Submit:
- The source code of your program
- The output of your program, while doing an iterative resolution of www.heise.de.

For details on the submission: see online FAQ.
Submission Deadline: Wed, 19 Nov 2008, 23:59h