CoE/EE 1150 Computer Networks
Due date: Wednesday, October 4, beginning of lecture

A Weather Client

1 Purpose

This introduces the Berkeley socket layer. You will write a client to interact with the *Weather Underground* api. This is *not* trivial so don't wait until the last minute! You have been warned.

2 Basic ideas

The Weather Underground (`wunderground.com`) is a provider of weather monitoring services including home stations. Your assignment is to write a client that is able to receive and print the current weather conditions.

3 Basic layout

Using any dialect of C, you are to write a client using the Berkeley sockets interface. The sketch is as follows:

1. Open a socket to the host `api.wunderground.com`.
2. Write an HTTP request string to the socket file descriptor.
3. Read a header and find the total size of the data
4. Read the full data
5. Print the current conditions

There is more to this than meets the eye. You can't just read the data into a huge buffer: you will block before you fill the buffer. So you will have to calculate the number of bytes from the result. Here is a sample response string:

```
HTTP/1.1 200 OK
Access-Control-Allow-Credentials: true
Access-Control-Allow-Origin: *
Content-Type: text/xml; charset=UTF-8
Last-Modified: Sun, 24 Sep 2017 02:22:15 GMT
Server: Apache/2.2.15 (CentOS)
X-CreationTime: 0.109
X-Varnish: 2571017174
Expires: Sun, 24 Sep 2017 02:22:15 GMT
Cache-Control: max-age=0, no-cache
Pragma: no-cache
Date: Sun, 24 Sep 2017 02:22:15 GMT
Content-Length: 12141
Connection: keep-alive

<response>
<version>0.1</version>
<termsofService>http://www.wunderground.com/weather/api/d/terms.html</te
rmsofService>
<features>
<feature>geolookup</feature>
<feature>conditions</feature>
</features>
<location>
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<country>US</country>
<country_iso3166>US</country_iso3166>
<country_name>USA</country_name>
<state>FL</state>
<city>Cape Coral</city>
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<l>/q/zmw:33904.1.99999</l>
<requesturl>US/FL/Cape_Coral.html</requesturl>
<wuiurl>http://www.wunderground.com/US/FL/Cape_Coral.html</wuiur
l>
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```

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<title>Weather Underground</title>
<link>http://www.wunderground.com</link>
</image>
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```

```
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<temp_f>79.6</temp_f>
<temp_c>26.4</temp_c>
<relative_humidity>84%</relative_humidity>
<wind_string>From the NNE at 3.0 MPH Gusting to 5.0 MPH</wind_st
ring>
<wind_dir>NNE</wind_dir>
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<pressure_mb>1011</pressure_mb>
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```

```
<icon>clear</icon>
<icon_url>http://icons.wxug.com/i/c/k/nt_clear.gif</icon_url>
<forecast_url>http://www.wunderground.com/US/FL/Cape_Coral.html<
/forecast_url>

        <history_url>http://www.wunderground.com/weatherstation/WXDailyHistory.a
sp?ID=KFLCAPEC112</history_url>

<ob_url>http://www.wunderground.com/cgi-bin/findweather/getForec
ast?query=26.574173,-81.949951</ob_url>
</current_observation>
</response>
```

Here are my hints:

1. Use `getaddrinfo` to get the right stuff for the `socket` call.

2. A sample HTTP request string is:
   `GET /api/b0a73c25c2f40b1b/conditions/q/CA/San_Francisco.xml HTTP/1.1 Host: api.wunderground.com`

3. Read a buffer for the header and find the total size of the response data The key field to notice is the `Content-Length: 12141`. This is the length of the output *after the header*. So, one way to do this is to read the header, find the content length, then read the remainder of the contents (knowing that some of the contents will be in the header).

4. Read the data into a big buffer

5. How you find the current conditions is up to you. There are many ways to do this: you can use an XML library, you can use the string matching library calls, you can farm it out. It's up to you.

6. By far the easiest thing to do is to divide the program into two programs. The first half does the read, the second half finds the forecast. This way you minimize the use of the wunderground site. Once you have the output, just use it as input for the "filter".

3.1 Using HTTP

You can find more details here:
`https://www.wunderground.com/weather/api/d/docs?d=data/index`

You can use either XML or JSON format. It doesn't matter.

Notice the key `b0a73c25c2f40b1b`. This is my personal key. You are welcome to use it with the understanding that only 10 keys can be used per hour and 500 max per month. If you wait until the last minute, you will be competing with others so either you (a) register and obtain another key (b) wait...

4 How you will be graded

1. Does it work?
2. Does it read the complete data?
3. How is the data handled? Is it flexible?
4. Error detection and recovery?
5. Style: Is the code readable?