Weather 1: Basic (Requirement)

I/O Specification

Welcome to WeatherPUD, where you get the weather you want, the way you want it.

To get your forecast, you will select your choices of source and date.

Please choose a source:

0) AccuWeather	1) BBC Weather	2) Climatic Research Unit (CRU)
3) KATU	4) KEX	5) KGW
6) KOIN	7) KOPB	8) KBPS
9) KPTV	10) KXL	11) National Weather Service
12) NPR	13) The Weather Channel	14) Weather Underground
15) Weather.com	16) Weather.gov	17) WeatherWizard

Your selection: 12

We are adjusting our satellite dish now to intercept weather broadcasts originating from NPR. We're doing this just for you!

Please choose the day for which you would like the weather forecast:[1]

```
 1)  9/1/2023     2)  9/2/2023     3)  9/3/2023     4)  9/4/2023     5)  9/5/2023
 6)  9/6/2023     7)  9/7/2023     8)  9/8/2023     9)  9/9/2023    10)  9/10/2023
11)  9/11/2023   12)  9/12/2023   13)  9/13/2023   14)  9/14/2023   15)  9/15/2023
```

Your selection: 8

Weather report from NPR concerning 9/8/2023 . . .

```
          Date: 9/8/2023
           Low: 73
          High: 88
 Chance of Rain: 10
       Summary: mostly sunny
        Source: NPR
```

---

[1] The dates should appear normal sized, evenly spaced, five abreast.

Weather 2: Plain, Upbeat, or Downbeat (Triple Extra Credit)

Sun or Rain

Volcanic Eruption

Pestilence

Background

Weather happens nearly every day. Some people just want the facts, others want to be entertained, and others tune in just hoping for an evacuation order so they don't have to go to work. Regardless of motive or listening preference, our multi-source, multi-mode weather service will help users prepare for their day. WeatherPUD has access to over a dozen sources of weather and will adjust its satellite angle to intercept whichever weather signal users select. Then, we package the weather for users in a format that is customized to each person's preference: Plain, Upbeat, or Downbeat. It is our variety that puts the PUD in WeatherPUD.

I/O Specification (*italics* indicate output visible in VERBOSE mode <u>only</u>)

Welcome to WeatherPUD, where you get the weather you want, the way you want it.

To get your forecast, you will select your choices of source, mode of delivery, and date.

The airwaves are filled with broadcast transmissions!
There are weather report transmissions from 18 sources!

Your name? Mitch

Welcome, Mitch!

Please choose a source:

0) AccuWeather	1) BBC Weather	2) Climatic Research Unit (CRU)
3) KATU	4) KEX	5) KGW
6) KOIN	7) KOPB	8) KBPS
9) KPTV	10) KXL	11) National Weather Service
12) NPR	13) The Weather Channel	14) Weather Underground
15) Weather.com	16) Weather.gov	17) WeatherWizard

Your selection: 12

We are adjusting our satellite dish now to 96.2° to intercept weather broadcasts originating from NPR. We're doing this just for you!

Please choose a mode of delivery:

    A) Plain
    B) Upbeat
    C) Downbeat

Your selection: C

Alright, alright. It's a hassle, but we'll tell you about the weather through our downbeat reporting. But we won't enjoy it, and it is doubtful that you will either.[2]

Please choose the day for which you would like the weather forecast:[3]

```
 1)  9/1/2023     2)  9/2/2023     3)  9/3/2023     4)  9/4/2023     5)  9/5/2023
 6)  9/6/2023     7)  9/7/2023     8)  9/8/2023     9)  9/9/2023    10)  9/10/2023
11)  9/11/2023   12)  9/12/2023   13)  9/13/2023   14)  9/14/2023   15)  9/15/2023
```

Your selection: 8

Intercepting transmission from 'NPR' concerning '9/8/2023' . . .

FYI you may just want to stay in bed today. It's undoubtedly going to be a crummy day. For starters, take a look at the weather:

```
                Date: 9/8/2023
                 Low: 73
                High: 88
       Chance of Rain: 10
             Summary: mostly sunny
            Humidity: 68
          Wind Speed: 12
      Wind Direction: NW
             Sunrise: 06:37
              Sunset: 19:31
            UV Index: 9
         Air Quality: Good
          Moon Phase: Waxing Crescent
          Visibility: 11 miles
       Precipitation: 0.03
  Barometric Pressure: 1012 hPa
           Dew Point: 62
              Source: NPR
```

It's pretty obvious today is going to have problems.

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[2] Output for downbeat mode is shown. For upbeat mode, output is instead to be, "Hurray, you've chosen the upbeat weather option! We're delighted and look forward to reporting the weather for you." For plain mode, output is to be, "You have selected our plain service, which will provide you with a plain weather report."
[3] The dates should appear normal sized, evenly spaced, five abreast.

Weather 3: With User History (Triple Extra Credit)

```
I/O Specification⁴:

Welcome to WeatherPUD, where you get the weather you want, the way you want it.

To get your forecast, you will select your choices of source, mode of delivery, and
date.

The airwaves are filled with broadcast transmissions!
There are weather report transmissions from 18 sources!

Your name? Mitch

Welcome, Mitch!

Please choose a source:
 0) AccuWeather     1) BBC Weather         2) Climatic Research Unit (CRU)
 3) KATU            4) KEX                 5) KGW
 6) KOIN            7) KOPB                8) KBPS
 9) KPTV           10) KXL                11) National Weather Service
12) NPR            13) The Weather Channel 14) Weather Underground
15) Weather.com    16) Weather.gov        17) WeatherWizard

Your selection: 2

We are adjusting our satellite dish now to 120.6° to
intercept weather broadcasts originating from Climatic Research Unit (CRU).
We're doing this just for you!


Please choose a mode of delivery:
  A) Plain
  B) Upbeat
  C) Downbeat

Your selection: A

You have selected our plain service, which will provide you with a plain weather
report.

Please choose the day for which you would like the weather forecast:
 1) 9/1/2023        2) 9/2/2023        3) 9/3/2023        4) 9/4/2023     5) 9/5/2023
 6) 9/6/2023        7) 9/7/2023        8) 9/8/2023        9) 9/9/2023    10) 9/10/2023
11) 9/11/2023      12) 9/12/2023      13) 9/13/2023      14) 9/14/2023   15) 9/15/2023


Your selection: 2

Intercepting transmission from 'Climatic Research Unit (CRU)' concerning '9/2/2023' . . .
```

---

[4] Alan, Bary, Yari, and Zoe are "fake" history planted by the program to provide a more robust demonstration of the history feature. These appear later in the output.

The plain weather report that you requested:

```
                                  Date: 9/2/2023
                                   Low: 64
                                  High: 88
                        Chance of Rain: 25
                               Summary: scattered clouds
                              Humidity: 72
                            Wind Speed: 8
                        Wind Direction: W
                               Sunrise: 06:31
                                Sunset: 19:43
                              UV Index: 6
                           Air Quality: Moderate
                            Moon Phase: First Quarter
                            Visibility: 10 miles
                         Precipitation: 0.03
                    Barometric Pressure: 1009 hPa
                             Dew Point: 59
                                Source: Climatic Research Unit (CRU)
```

According to Climatic Research Unit (CRU)...
        Temperature is expected to reach a high of 88 today.
        Today's low is forecast at 64.
        Rain is expected today.

Please choose what to do next:
C) Continue   H) Show History   Q) Quit

 Your choice: H

You are the grader, you get to see the whole tree!

```
Alan
    Login: 2023-08-28 11:50:46    Source: NPR                          Mode: Plain       Date: 9/1/2023
    Login: 2023-08-28 11:50:46    Source: KOIN                         Mode: Upbeat      Date: 9/2/2023
    Login: 2023-08-28 11:50:46    Source: KGW                          Mode: Downbeat    Date: 9/3/2023
Barry
Mitch
    Login: 2023-08-28 11:51:03    Source: Climatic Research Unit (CRU)  Mode: Plain       Date: 9/2/2023
Yari
Zoe
```

History for the current user (you) will grow with each weather report you view!

Please choose what to do next:
C) Continue   H) Show History   Q) Quit

 Your choice: c

Please choose a source:
 0) AccuWeather   1) BBC Weather   2) Climatic Research Unit (CRU)
 3) KATU   4) KEX   5) KGW

5

```
 6) KOIN              7) KOPB                8) KBPS
 9) KPTV             10) KXL                11) National Weather Service
12) NPR              13) The Weather Channel  14) Weather Underground
15) Weather.com      16) Weather.gov        17) WeatherWizard
```

Your selection: 11

We are adjusting our satellite dish now to 117.0° to
intercept weather broadcasts originating from National Weather Service.
We're doing this just for you!

Please choose a mode of delivery:
  A) Plain
  B) Upbeat
  C) Downbeat

Your selection: b

Hurray, you've chosen the upbeat weather option! We're delighted and look forward to
reporting the weather for you!

Please choose the day for which you would like the weather forecast:
```
 1) 9/1/2023     2) 9/2/2023     3) 9/3/2023     4) 9/4/2023      5) 9/5/2023
 6) 9/6/2023     7) 9/7/2023     8) 9/8/2023     9) 9/9/2023     10) 9/10/2023
11) 9/11/2023   12) 9/12/2023   13) 9/13/2023   14) 9/14/2023    15) 9/15/2023
```

Your selection: 7

Intercepting transmission from 'National Weather Service' concerning '9/7/2023' . . .

It's going to be a great day! For starters, take a look at the weather you can
expect:

```
                          Date: 9/7/2023
                           Low: 63
                          High: 80
                Chance of Rain: 50
                       Summary: showers likely
                      Humidity: 78
                    Wind Speed: 24
                Wind Direction: SE
                       Sunrise: 06:36
                        Sunset: 19:33
                      UV Index: 6
                   Air Quality: Unhealthy
                    Moon Phase: Waning Gibbous
                    Visibility: 6 miles
                 Precipitation: 0.18
            Barometric Pressure: 1006 hPa
                     Dew Point: 66
                        Source: National Weather Service
```

Remember, the future hasn't been written yet.

The future is what you make it . . . So make it a good one!

According to National Weather Service...
        Temperature is expected to get up to an amazing a high of 80 degrees today!
        Today's low is forecast at a cozy 63 degrees.
        You should carry an umbrella; I would expect some rain. Hurray for the
environment!
        Today is a great day to head to the river or lake. It should be hot enough
for some real enjoyment!
        Quite a breezy day, enjoy!

        Alert: Unhealthy or Hazardous air quality warrants taking precautions today.
Be safe, friend! Enjoy chilling indoors if possible. Take a day off from the gym.
        Today isn't a leg day or an arm day. It's a lung day, champ! You're being
healthy by not excercising outside in today's air.
        It might just be the perfect day for indoor cleaning or catching up with some
reading!

Please choose what to do next:
C) Continue   H) Show History   Q) Quit

 Your choice: h

You are the grader, you get to see the whole tree!

Alan
    Login: 2023-08-28 11:50:46   Source: NPR   Mode: Plain   Date: 9/1/2023
    Login: 2023-08-28 11:50:46   Source: KOIN   Mode: Upbeat   Date: 9/2/2023
    Login: 2023-08-28 11:50:46   Source: KGW   Mode: Downbeat   Date: 9/3/2023
Barry
Mitch
    Login: 2023-08-28 11:51:03   Source: Climatic Research Unit (CRU) Mode: Plain   Date: 9/2/2023
    Login: 2023-08-28 11:51:22   Source: National Weather Service   Mode: Upbeat   Date: 9/7/2023
Yari
Zoe

History for the current user (you) will grow with each weather report you view!

Please choose what to do next:
C) Continue   H) Show History   Q) Quit

 Your choice: C

Please choose a source:
 0) AccuWeather   1) BBC Weather   2) Climatic Research Unit (CRU)
 3) KATU   4) KEX   5) KGW
 6) KOIN   7) KOPB   8) KBPS
 9) KPTV   10) KXL   11) National Weather Service
12) NPR   13) The Weather Channel   14) Weather Underground
15) Weather.com   16) Weather.gov   17) WeatherWizard

Your selection: 14

We are adjusting our satellite dish now to 122.0° to
intercept weather broadcasts originating from Weather Underground.
We're doing this just for you!

Please choose a mode of delivery:
  A) Plain
  B) Upbeat
  C) Downbeat

Your selection: c

Alright, alright. It's a hassle, but we'll tell you about the weather through our
downbeat reporting. But we won't enjoy it, and it is doubtful that you will either!

Please choose the day for which you would like the weather forecast:
 1) 9/1/2023   2) 9/2/2023   3) 9/3/2023   4) 9/4/2023   5) 9/5/2023
 6) 9/6/2023   7) 9/7/2023   8) 9/8/2023   9) 9/9/2023   10) 9/10/2023
11) 9/11/2023   12) 9/12/2023   13) 9/13/2023   14) 9/14/2023   15) 9/15/2023

Your selection: 15

Intercepting transmission from 'Weather Underground' concerning '9/15/2023' . . .

FYI you may just want to stay in bed today. It's undoubtedly going to be a crummy
day. For starters, take a look at the weather:

```
                     Date: 9/15/2023
                      Low: 77
                     High: 78
           Chance of Rain: 15
                  Summary: sunny intervals
                 Humidity: 70
               Wind Speed: 14
           Wind Direction: NE
                  Sunrise: 06:44
                   Sunset: 19:17
                 UV Index: 8
              Air Quality: Excellent
               Moon Phase: Waxing Crescent
               Visibility: 10 miles
            Precipitation: 0.02
      Barometric Pressure: 1010 hPa
                Dew Point: 58
                   Source: Weather Underground
```

It's pretty obvious today is going to have problems.

According to Weather Underground...
        Temperature is expected to reach a high of 78 degrees today. Can you believe
that?
        Today's low is forecast at 77 degrees, which stinks, too.
        Rain is expected today. What a downer.
        Today's high temperature will be uncomfortably hot, so plan to be miserable
as long as this hot spell lasts.

```
Please choose what to do next:
C) Continue   H) Show History   Q) Quit

 Your choice: h


You are the grader, you get to see the whole tree!

Alan
    Login: 2023-08-28 11:50:46    Source: NPR                          Mode: Plain      Date: 9/1/2023
    Login: 2023-08-28 11:50:46    Source: KOIN                         Mode: Upbeat     Date: 9/2/2023
    Login: 2023-08-28 11:50:46    Source: KGW                          Mode: Downbeat   Date: 9/3/2023
Barry
Mitch
    Login: 2023-08-28 11:51:03    Source: Climatic Research Unit (CRU)  Mode: Plain      Date: 9/2/2023
    Login: 2023-08-28 11:51:22    Source: National Weather Service      Mode: Upbeat     Date: 9/7/2023
    Login: 2023-08-28 11:51:44    Source: Weather Underground           Mode: Downbeat   Date: 9/15/2023
Zoe

History for the current user (you) will grow with each weather report you view!


Please choose what to do next:
C) Continue   H) Show History   Q) Quit

 Your choice: q


Thank you for using WeatherPUD. Please tell your friends!

Bye, Mitch!
```

Weather 4: API (Triple Extra Credit)

As above, but source your weather data from a live source using an API.

Tips/leads[5]

There are several weather data sources with APIs that you can use to retrieve weather data for your C++ program. Here are a few popular options:

1. **OpenWeatherMap API:** OpenWeatherMap provides a wide range of weather data, including current weather, forecasts, and historical weather data. They offer a free tier with limited requests per minute and paid plans for more extensive usage.

API Documentation: OpenWeatherMap API

2. **Weatherstack API:** Weatherstack is a weather data provider that offers current weather data, forecasts, and historical weather data. They have a free plan with limited features and paid plans for more extensive usage.

API Documentation: Weatherstack API

3. **Dark Sky API (now part of Apple):** Dark Sky, now part of Apple, provides hyper-local weather data, including minute-by-minute precipitation forecasts. Note that access to the Dark Sky API may have some restrictions after being acquired by Apple.

API Documentation: Dark Sky API

4. **AccuWeather API:** AccuWeather is a well-known weather data provider. They offer a wide range of weather data services, including current conditions, forecasts, and severe weather alerts. Access to the AccuWeather API typically requires a paid subscription.

API Documentation: AccuWeather API

5. **The Weather Channel API:** The Weather Channel (Weather.com) provides weather data through an API. You may need to contact them to inquire about API access and pricing.

API Documentation: The Weather Channel API

Before using any of these APIs in your C++ program, make sure to read their documentation thoroughly and check for any terms of use or pricing information. Additionally, consider using a C++ HTTP library, such as cURL or libcurl, to make HTTP requests to these APIs and retrieve weather data for your application.

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[5] gathered from an external source, generative AI, copyright free