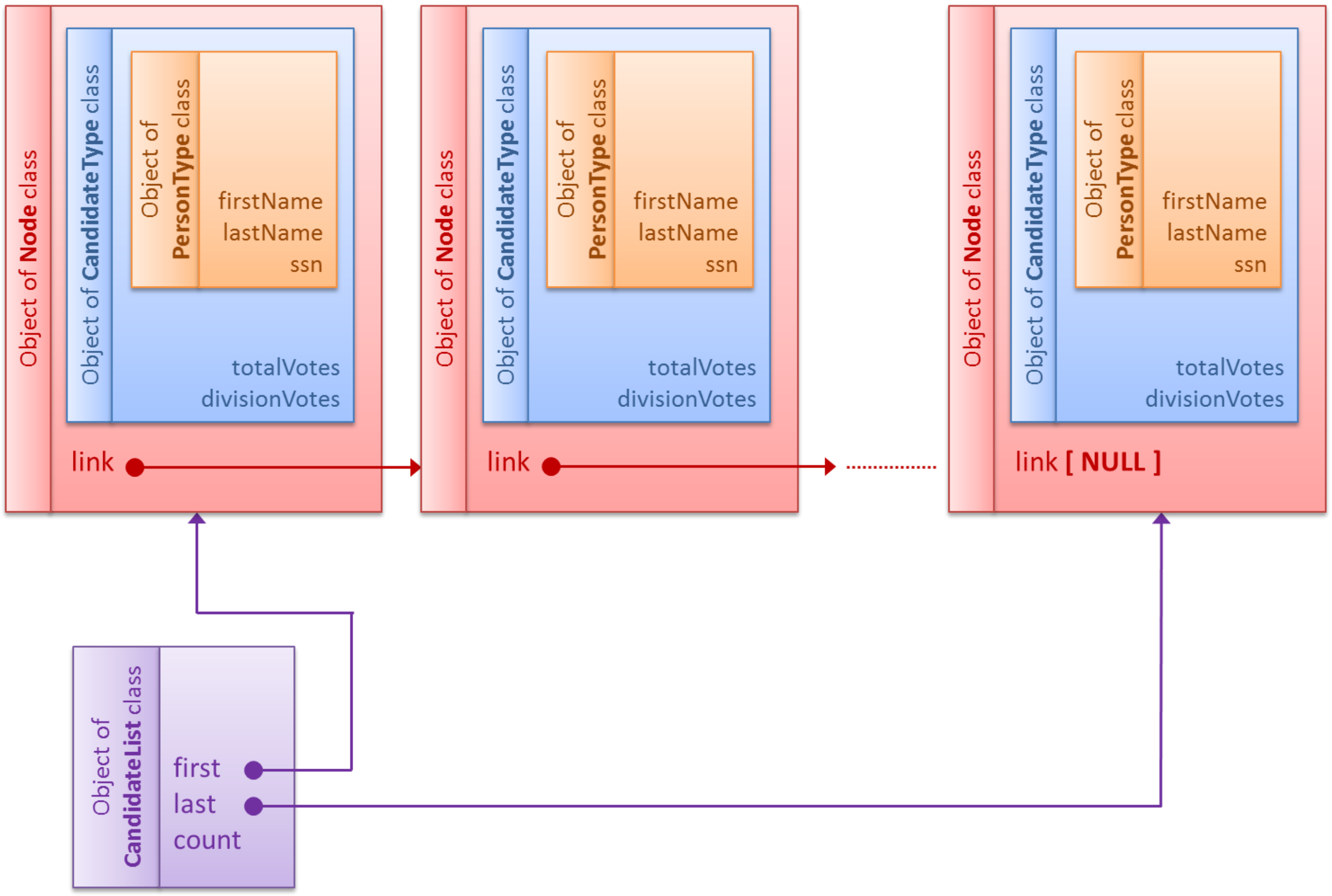
Project 1 (Part C) - Candidate List

For this part of the project, you will need to add to your project all the files in the **p1_c_candidate_list_files project**. Directions on how to import files into a project are available on the class Web site, reference slides: **How to create a project**.

CANDIDATE LIST

For this part of the project, you will complete the class **CandidateList** that creates a **singly-linked list** of nodes containing objects of the class **CandidateType** and a pointer to the next node.



Import into your project the following files:

- CandidateList.h
- CandidateList.cpp
- candidate_data.txt
- InputHandler.h
- Main.cpp (this will replace your old Main.cpp file)

candidate_data.txt

The **candidate_data.txt** file should be placed in the **Resource Files** folder of your project. The file contains a list of candidates to add to the linked list your program creates. Each line contains a **social security number**, a first name, a last name, and four integers indicating the votes by division (first integer for division 0, second integer for division 1, and so on):

```
123456789 Donald Duck 89 34 45 5
```

The file ends with "**-999**" to stop the loop when reading the data.

InputHandler.h

The **InputHandler.h** reads data from the **candidate_data.txt** file and inserts it in the list of candidates. It first checks if the file is available and the data can be read; if not, it will terminate the program.

The function **createCandidateList** creates objects of class **CandidateType** and it stores them in the list by calling the function **addCandidate** of the class **CandidateList**.

Although the implementation of this file is complete, do **NOT** dismiss it! Pay careful attention to the function **createCandidateList** to understand how everything is inserted in the list.

Main.cpp

The **Main.cpp** creates the menu and all selections associated with it, to allow the user to select one of the following:

1. Print all candidates
2. Print a candidate's division votes
3. Print a candidate total vote
4. Print winner
5. To exit

Although the implementation is completed, you should trace it to see what it does and how it connects everything.

IMPLEMENTATION

The **CandidateList interface** already has a class **Node** that creates **nodes** storing a **CandidateType object** and a pointer **link** that points to the next node. The file also includes the partial definition of the class **CandidateList**, which creates objects that contain a pointer **first** to point to the first node in the list, a pointer **last** to point to the last node in the list, and an int **count** to keep track of the number of nodes in the list.

You will need to implement the class **CandidateList** as follows:

- **Member variables**
  - A pointer that points to the first node.
  - A pointer that points to the last node.
  - An integer variable that stores the number of nodes.

- **Default constructor**
  - Initializes all member variables.

- Function **addCandidate**
  - **Parameters:** An object of the **CandidateType** class.
  - Inserts nodes to the *back* of the list.

        - You have a pointer pointing to the back of the list; therefore, there is **NO** need to traverse the list.

- Function **getWinner**
    - Traverses the list to find the candidate who has the highest number of votes, and returns the social security number associated with that candidate.
    - If the list is empty, output the error message "List is empty." and return 0.

- Function **printCandidateName**
    - **Parameters:** A social security number.
    - Traverses the list to find the candidate with the given social security number and prints out the name using the **printName** function of the **PersonType** class.
    - Use a **while** loop so that you can **stop** the loop when the candidate is found.
        - You are **NOT** allowed to use "break" or "continue"
    - If the list is empty, output the error message "List is empty."
    - If the candidate was *not* found, output the error message "SSN not in the list."

- Function **printAllCandidates**
    - Traverses the list to print all candidates using the **printCandidateInfo** function of the **CandidateType** class.
    - If the list is empty, output the error message "List is empty."

- Function **printCandidateDivisionVotes**
    - **Parameters:** A social security number and a division number.
    - Prints out all the division votes for a given candidate, using the **getVotesByDivision** function of the **CandidateType** class.
    - Use a **while** loop so that you can **stop** the loop when the candidate is found.
        - You are **NOT** allowed to use "break" or "continue"
    - If the list is empty, output the error message "List is empty."

- Function **printCandidateTotalVotes**
    - **Parameters:** A social security number.
    - Traverses the list to find the candidate with the given social security number and prints out the total number of votes using the **getTotalVotes** function of the **CandidateType** class.
    - Use a **while** loop so that you can **stop** the loop when the candidate is found.
        - You are **NOT** allowed to use "break" or "continue"
    - If the list is empty, output the error message "List is empty."

- Function **destroyList**
    - Traverses the list to delete each node and reset all member variables to their default value.

- **Destructor**
    - Calls the function **destroyList**.

The **Main.cpp** file reads from the **candidates_data.txt** file and calls the appropriate functions to insert each candidate in a list. It also displays a menu for the user to make selections. There are three social security numbers in the list that are **easy to type**: 123456789, 987654321, and 111222333, to make it easier for you test.

Do **NOT** modify any of the code given and do **NOT** add any additional functions and/or member variables.

ASSUMPTIONS

- Social security numbers are **unique**.
- **No** candidates have the same number of total votes; there are **no** ties.

EXPECTED OUTPUT

The **output.exe** file is your reference to compare results and format with the output of your own project.

DUE DATE

Although this is **NOT** the final part of the project, you will need to turn in a copy of your project **next week (day 1)**. If you have not completed the **CandidateList** class you can still turn it in, as long as you have completed the **CandidateType** and **PersonType** class. You will get instructions on how to turn in the project at the beginning of class.