Homework #5b: Page Replacement Algorithms (50 pts)
Submit a compressed folder containing **hw5.cpp** and **Makefile** to Canvas

For this assignment, you must implement simulated page replacement in **C++**. Specifically, you program must meet the following requirements:

- Takes 2 command line arguments:
  - `num_frames` := number of **frames** in simulated physical memory
  - `algorithm` := the **page replacement** algorithm to simulate, either:
    - **FIFO** := First In, First Out
    - **OPT** := Optimal page replacement
    - **LRU** := Least Recently Used

- Reads a *sequence* of page references from **stdin**
  - Integer "page numbers" separated by *white space*
  - E.g., "7 0 1 2"
    - Reference page 7, then 0, then 1, then 2

- Writes the algorithm's *progress* to **stdout**
  - Requested page number
  - Whether a page fault occurred
  - A snapshot of physical memory
    - -1 represented empty frame
    - positive integer represents page in frame

- Keeps track of **page faults**, write results to **stderr** (after simulation completed)

HINTS:
- C++ standard template library
- No threads needed
- int tmp; while(cin >> tmp) { }
- Paper / pencil first

EXAMPLES:

```
UNIX > ./hw5
usage: ./hw5 num_frames algorithm

UNIX > ./hw5 3 BLERG
ERROR: algorithm must be FIFO, OPT, or LRU

UNIX> ./hw5 -1 FIFO
ERROR: num_frames must be > 0
```

```
UNIX > echo 1 2 1 3 | ./hw5 2 FIFO
==========================
requesting page:     1
PAGE FAULT!!!
--------------------------
    1
   -1
--------------------------
==========================
requesting page:     2
PAGE FAULT!!!
--------------------------
    1
    2
--------------------------
==========================
requesting page:     1
--------------------------
    1
    2
--------------------------
==========================
requesting page:     3
PAGE FAULT!!!
--------------------------
    3
    2
--------------------------
-=-=-=-=-=-=-=-=-=-=-=-=-=-
    3 page faults occurred
```

//page sequence example from book (ignoring stdout)

```
hw5 > cat input.txt
7 0 1 2 0 3 0 4 2 3 0 3 2 1 2 0 1 7 0 1

UNIX > ./hw5 3 FIFO < input.txt > /dev/null
-=-=-=-=-=-=-=-=-=-=-=-=-=-
   15 page faults occurred


UNIX > ./hw5 3 OPT < input.txt > /dev/null
-=-=-=-=-=-=-=-=-=-=-=-=-=-
    9 page faults occurred


UNIX > ./hw5 3 LRU < input.txt > /dev/null
-=-=-=-=-=-=-=-=-=-=-=-=-=-
   12 page faults occurred


UNIX >
```