

Worksheet: Arrays and Loops

2D arrays are helpful in storing information about data collected when a location needs to be stored. In archeology, a dig site is typically divided into a grid of one foot squares that are marked off with string. The following array, grid, represents the number of artifacts found in each square of a dig site:

| | | | | | |
|---|---|---|---|---|---|
| 0 | 4 | 1 | 8 | 6 | 1 |
| 4 | 7 | 7 | 0 | 7 | 1 |
| 0 | 8 | 8 | 5 | 3 | 1 |
| 4 | 0 | 3 | 4 | 4 | 7 |
| 6 | 1 | 7 | 5 | 6 | 0 |

1. Write the code to print out the total number of square feet at the site.
2. Write the code to find the total number of artifacts found at this dig site.
3. Write a method to count how many locations on the grid have a certain number of artifacts. So if 7 is passed in, it would return 5.



4. Write the code for a class, `Location`, to store the row and column of an artifact in the grid. The maximum size of the grid should be 500x500. The class should include the following methods:
- `Location()` – Default constructor initializes to location (0,0).
 - `Location(int r, int c)` – Constructor to create a location with row `r` and column `c`.
 - `int getRow()` and `int getCol()` – Getter methods which return the row and column of the location.
 - `void setRow(int r)` and `void setCol(int c)` – Setter methods which modify the row and column of the location. (These should also make sure that the new location is within the maximum grid size)
 - `boolean equals(Location o)` – Comparison method which returns true if two locations have the same row and column.



- Write a method to return an ArrayList of all locations that contain a certain number of artifacts. So if 5 is passed in, the method would return a list of the locations (2,3) and (4,3). (Use the location class that you wrote in question 4.)
- Re-write the method from question 3, this time using the method and class that you wrote for questions 4 and 5.