

Assignment 2

Due. Oct. 5 (Wednesday), 17:30.

Programming style (10 marks).

1. (8 marks) Chapter 2, Programming 11, p. 81.

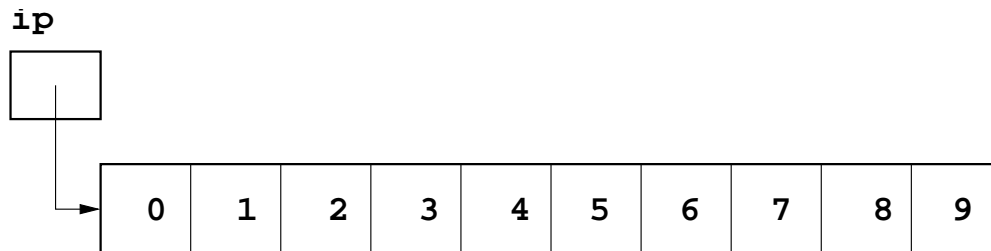
Write a function `IndexArray(n)` that returns a pointer to a dynamically allocated integer array with `n` elements, each of which is initialized to its own index. For example, assuming that `ip` is declared as

```
int *ip;
```

the statement

```
ip = IndexArray(10);
```

should produce the following memory configuration:



2. (10 marks) Chapter 2, Programming 14, p.83.

Suppose that you have been assigned the task of computerizing the card catalog system of a library. As a first step, your supervisor has asked you to develop a prototype capable of storing the following information for each of 1000 books:

- The title
- A list of up to five authors
- The Library of Congress catalog number
- A list of up to five subject headings
- The publisher
- The Year of publication
- Whether the book is circulating or noncirculating

Design the data structure that would be necessary to keep all the information required for the prototype library database. Given your definition, it should be possible to write the declaration

```
LibraryT libdata;
```

and have the variable `libdata` contain all the information you would need to keep track of up to 1000 books. Remember that the actual number of books will usually be less than this upper bound.

Write an additional procedure `SearchBySubject` that takes as parameters the library database and a subject string. For each book in the library that lists the subject string as one of its subject headings, `SearchBySubject` should display the title, the name of the first author, and the Library of Congress catalog number of the book.

3. (10 marks) Chapter 3, Programming 2, p.116.

Write a program that simulates flipping a coin repeatedly and continues until three *consecutive* heads are tossed. At that point, your program should display the total number of coin flips that were made. The following is one possible sample run of the program:

```
tails
heads
heads
tails
tails
heads
tails
heads
heads
heads
It took 10 flips to get 3 consecutive heads.
```

4. (10 marks) Chapter 3, Programming 8, p. 119.

Without using the string method `substr`, implement your own function `SubString(s, pos, len)`, which returns the substring of `s`, beginning at position `pos` and including at most `len` characters. Make sure that your function correctly applies the following rules:

- If `pos` is negative, it is set to 0 so that it includes the first character in the string.
- If `len` is greater than `s.length() - pos`, it is set to `s.length() - pos` so that it stops at the last character.
- If `pos` is greater than `s.length() - 1`, `SubString` returns the empty string.