

WARMING UP FOR THE EXPEDITION TO SAIL THE SEA OF CS FIRST TASK: UNDERSTANDING ALGORITHMS

- A finite sequence of <u>unambiguous</u>, <u>executable steps</u> which when followed achieves a <u>specific objective</u>.
- An <u>algorithm</u> always <u>terminates</u>.
- A program is a machine executable version of the algorithm which may or may not terminate. (e.g.: Operating system is a program which does not terminate).

ALGORITHM LARGESTNUMBER

(SOURCE: WIKIPEDIA)

```
LargestNumber
Input: A non-empty list of numbers L.
                                                        Temporary container
Output: The largest number in the list L.
                                                        to store the current
                                                        largest no.
largest \leftarrow 0
for each item in the list L > 1,
      do
        if item > largest,
                                                                 -" is a loose
        then largest \leftarrow item
                                                              shorthand for
      end do
                                                              "changes to
end for
return largest
```

ALGORITHM LARGESTNUMBER

(SOURCE: WIKIPEDIA)

```
    LargestNumber

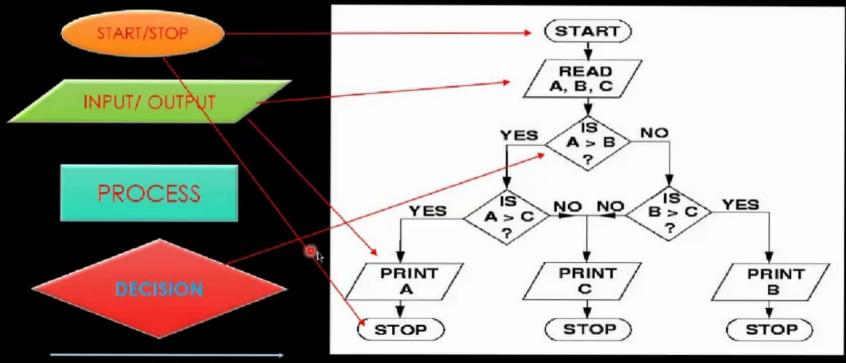
  Input: A non-empty list of numbers L.
  Output: The largest number in the list L.
  largest \leftarrow 0
  for each item in the list L \ge 1,
        do
          if item > largest,
                                            2>0?
                                                           8 > 2?
                                                                             1 > 8?
                                            largest ← 2
                                                           largest ← 8
          then largest \leftarrow item
        end do
 end for
                                            largest is 8
 return largest
```

- For instance, "largest ← item" means that the value of largest changes to the value of item.
- "return" terminates the algorithm and outputs the value that follows.

Flowchart: A representational scheme for algorithms

Components of a flowchart

 To find the largest of three given numbers



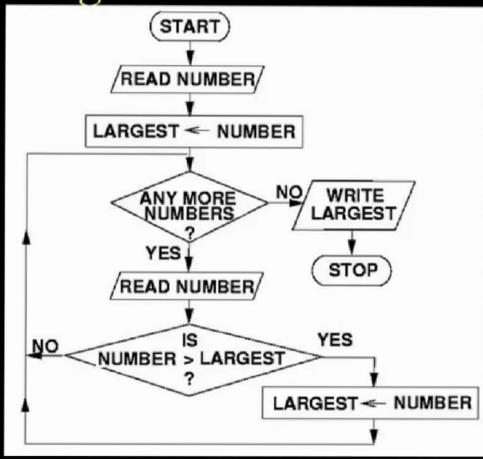
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ALGORITHM: LARGEST OF 3 NUMBERS

- 1. READ A, B, C
- 9 2. IF (A > B) THEN goto 8.
 - 3. IF (B > C) THEN go to 6
 - 4. PRINT C
 - 5. STOP
 - 6. PRINT B
 - 7. STOP
 - 8. IF (A > C) THEN goto 10
 - 9. goto 4
 - 10. PRINT A
 - 11. STOP

SELF HELP:

Largest of a set of numbers.



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THE **SEA OF Cs**: BRIEF HISTORY

- C evolved from two previous languages, BCPL and B.
- Basic Combined Programming Language (BCPL) was developed in 1967 by Martin Richards.
- B, in 1970 by Ken Thompson.
- C, in 1972 by Dennis Ritchie at Bell Labs.
- C is widely used with UNIX operating system.
- Many versions of the language C were created by many people
- This created problems with portability
- ANSI (American National Standards Institute) standardized the language and proposed ANSI-C

SO, WHAT'S IN A C PROGRAM?

- A C program is a set of functions.
- Every C program should have a function with name main()
- Execution of the program starts with main()
- Some functions that perform common tasks come as part of the C language. These functions are available in libraries.
- · For e.g. the functions that perform basic input and output are available
 - in a library called *stdio.h* (i.e. Standard I/O)
- Libraries that comes along with C compiler are called standard libraries
- So, you need to learn
 - The C language and
 - Also how to use the standard

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SAILING THE SEA OF CS: C PROGRAM FOR HOW TO PRONOUNCE C

```
Comment: This program Prints -
Pronounce C as SEA
#include <stdio.h>
int main (void)
  printf("Pronounce C as SEA.\n")
  return 0;
                      Note the green symbols.
                      They constitute the syntax.
   End of main */
                      Adhere to them strictly.
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```

Ou

z = f(x,y)
z = f()
\(\n \) indicates a new line. The cursor is moved to the next line.

• Program Output:

Pronounce C as SEA.

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C PROGRAM: SUM OF A AND B

```
#include <stdio.h>
                                       Header file:
                                        Standard
int main(void)
                                      Input / Output
  int A,B, S;
                                        Variable
                                      Declarations
  printf("Enter two numbers") >
                                    Printing message
                                        on screen
                                     Asking for inputs
  scanf("%d %d",&A,&B);
                                     from keyboard
                                        Compute
  S = A + B;
                                     Output Result on
  printf("Res=%d", S);
                                         screen
  return 0;
```

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