CMPS 10 1-8-08

WHAT IS COMPUTER SCIENCE?

- THE STUDY OF ALGORITHMS:
  - (1) MATHEMATICAL PROPERTIES
  - (2) HARDWARE REALIZATIONS
  - (3) SOFTWARE REALIZATIONS
  - (4) APPLICATIONS TO OTHER DISCIPLINES

EX. PROBLEM: ADD TWO NUMBERS:

$$\begin{array}{r} 100 \\ 493 \\ +\ 751 \\ \hline 1244 \end{array} \qquad \begin{array}{r} 1010 \\ 617 \\ 945 \\ \hline 1562 \end{array}$$

$m = 3$

$a_2 = 6, a_1 = 1, a_0 = 7$

$b_2 = 9, b_1 = 4, b_0 = 5$

$c_3 = 1, c_2 = 5, c_1 = 6, c_0 = 2$

PROBLEM: ADD TWO m-DIGIT NUMBERS

$$a_{m-1}\, a_{m-2} \cdots a_2\, a_1\, a_0$$

AND

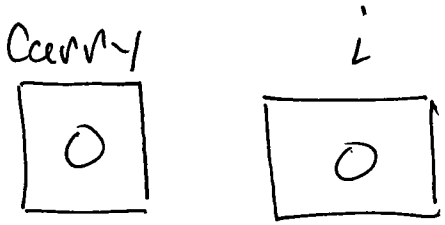
$$b_{m-1}\, b_{m-2} \cdots b_2\, b_1\, b_0$$

} INPUT & $m \geq 1$

TO GET A SUM

$$c_m\, c_{m-1}\, c_{m-2} \cdots c_2\, c_1\, c_0$$

} OUTPUT

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1.) Carry ← 0
2.) i ← 0
3.) while i < m do 4-10
4.)     c_i ← a_i + b_i + Carry
5.)     if c_i ≥ 10 Do 6-7
6.)         c_i ← c_i - 10
7.)         Carry ← 1
8.)     else Do 9
9.)         Carry ← 0
10.)    i ← i + 1
11.) c_m ← Carry
12.) Print c_m c_{m-1} .... c_2 c_1 c_0
13.) Stop
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EX TRACE EXECUTION ON $m = 3$

617
+945
.....

INPUT