



SCHOOL OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

G51CSA Homework/Tutorial Problems – LMC

The following problems are adopted from reference C, Irv Englander, **The architecture of Computer Hardware and Software**, John Wiley & Sons, Inc, 2000, pp. 160 -161

1. The steps that the Little Man performs are closely related to the way in which the CPU actually executes instructions. Draw a flow char that carefully describes the steps that the Little Man follows to execute following instructions
 - (a) SUBTRACT
 - (b) BRANCH ON POSITIVE
2. Write a Little Man program that accepts three values as input and produces the largest of three as output
3. Write a Little Man program that accepts three values as input and output them in order of sizes, largest to smallest.
4. Write a Little Man program that prints out the odd numbers from 1 to 99. No input is required.
5. Show how you would implement the following statements using Little Man instructions
 1. IF-THEN-ELSE
 2. REPEAT-UNTIL
6. The following Little Man program is supposed to add two input numbers, subtract a third input numbers from them, and output the result, i.e.,

$$\text{OUT} = \text{IN1} + \text{IN2} - \text{IN3}$$

Mailbox	Mnemonic Code	Numeric Code
00	IN	901
01	STO 99	399
02	IN	901
03	ADD 99	199
04	STO 99	399
05	IN	901
06	SUB 99	299
07	OUT	902
08	HALT	000

What is wrong with this program? Modify the program so that it produces the correct result.



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7. Consider the following program written in Little Man machine language:

Mailbox	Numeric Code
00	519
01	320
02	901
03	318
04	901
05	319
06	518
07	217
08	318
09	813
10	520
11	902
12	000
13	520
14	119
15	320
16	606
17	001
18	000
19	000
20	000

- (a) Draw a flow chart that describes the steps the Little Man follows to execute the program
- (b) What output will the program produce if the input values are 2 and 4?
- (c) State in one sentence what this program does.