

# Homework Assignment 1 for CSCI 109: Introduction to Computing

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1. D
2. Bits encoded =  $\log_2 200 \approx 8$   
Trits encoded =  $\log_3 200 \approx 5$
3. **State**: the condition of a system at a point in time (3)  
**Abstraction**: a simplified or higher-level representation of a concept (4)  
**Encoding**: the symbolic expression used to represent an object or concept (10)  
**Discrete**: individually separate and distinct (5)  
**Binary**: a system of numerical notation that uses base 2 (11)
4. (1). Jacquard Loom contains a large number of instructions.  
(2). Jacquard Loom is not capable of counting, meaning that it cannot program repetitive steps.  
(3). Jacquard Loom is not capable of modularity, meaning that it cannot use functions and methods.

5. A.

Program Counter	Register			Memory			
	R1	R2	R3	101	102	103	104
Before program starts				1	3	2	
1	3			1	3	2	
2	3			1	3	2	3
3	3	1		1	3	2	3
4	3	1	1	1	3	2	3
5	3	1	1	1	3	1	3
6	3	2	1	1	3	1	3
7	3	2	1	1	3	1	3
11	1	2	1	1	3	1	3
12	1	3	1	1	3	1	3
13	1	3	3	1	3	3	3
14	1	3	3	1	3	3	3
5	1	3	3	1	3	3	3
6	1	6	3	1	3	3	3
7	1	6	3	1	3	3	3
8	1	6	6	1	3	3	3
9	12	6	6	1	3	3	3
10	12	6	6	1	12	3	3
11	6	6	6	1	12	3	3

12	6	3	6	1	12	3	3
13	6	3	3	1	12	3	3
14	6	3	3	1	12	3	3
15	3	3	3	1	12	3	3
16	3	3	3	1	12	3	3

B. 23.

C. The maximum value is 2, because when the value is equal to or less than 2, instruction 14 would not be satisfied, thus jumping to the last steps. However, when the value is greater than 2, instruction 14 would be satisfied and the program has to restart at the fifth instruction, hence carrying out more steps.

D. Infinite number of execution steps would be carried out, as the values of R1 and R2 never change in the program.