Course: Computing for Engineers – ENGG 233

Lab #: Lab 1

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Lab Section: L01

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Exercise 3: Binary Operations

Task 3.1: Single Byte Computations

A. $01110110_2 = 2^1 + 2^2 + 2^4 + 2^5 + 2^6 = 2 + 4 + 16 + 32 + 64 = 118_{10}$

B. $169_{10} = ?_2$
   169/2 = 84 remainder 1
   84/2 = 42 remainder 0
   42/2 = 21 remainder 0
   21/2 = 10 remainder 1
   10/2 = 5 remainder 0
   5/2 = 2 remainder 1
   2/2 = 1 remainder 0
   $169_{10} = 10101001$

C. $11111111_2 = 2^0 + 2^1 + 2^2 + 2^3 + 2^4 + 2^5 + 2^6 + 2^7 = 1 + 2 + 4 + 8 + 16 + 32 + 64 + 128 = 255_{10}$

D. $11111110_2 = 2^1 + 2^2 + 2^3 + 2^4 + 2^5 + 2^6 + 2^7 = 254_{10}$

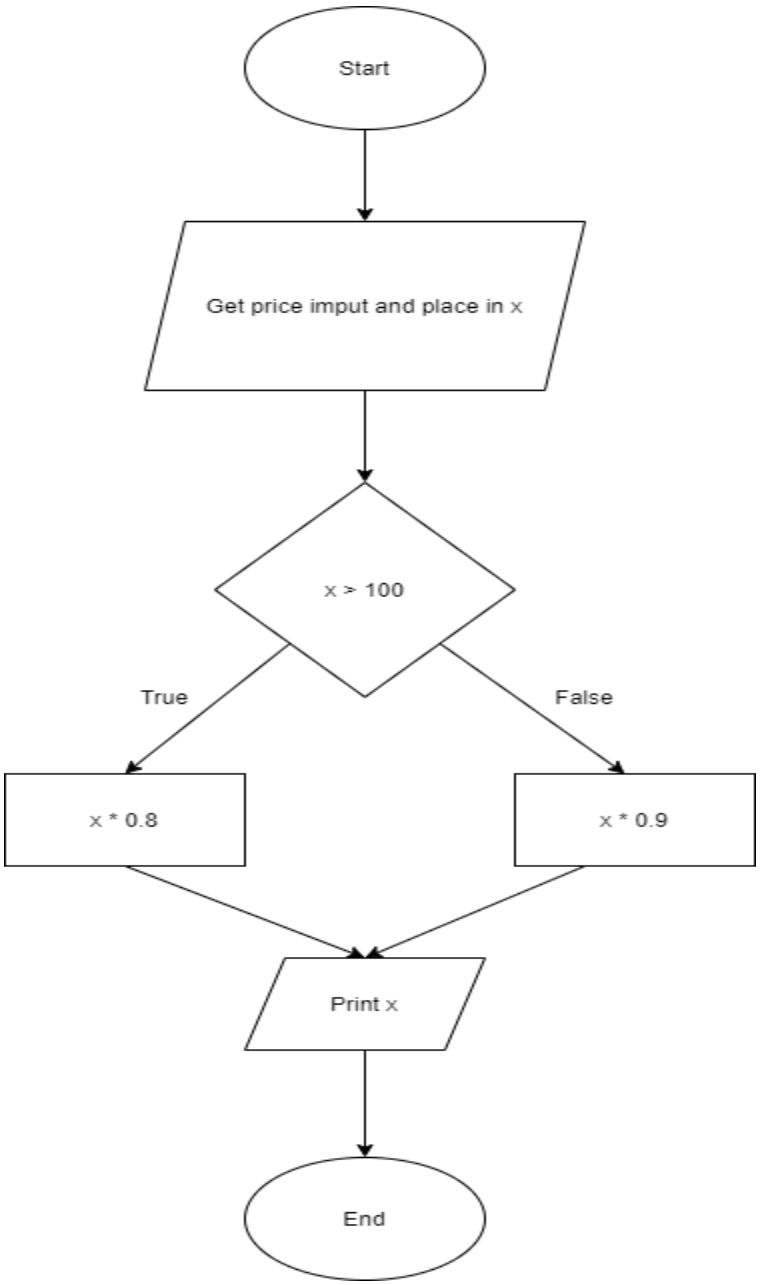
Task 3.2: Multiple Byte Computations

E. $1101010101_2 = 2^0 + 2^2 + 2^4 + 2^6 + 2^8 + 2^9 = 1 + 4 + 16 + 64 + 256 + 512 = 853_{10}$

F. $511_{10} = 2^0 + 2^1 + 2^2 + 2^3 + 2^4 + 2^5 + 2^6 + 2^7 + 2^8 = 111111111_2$

G. $1111111111111111_2 = 2^0 + 2^1 + 2^2 + 2^3 + 2^4 + 2^5 + 2^6 + 2^7 + 2^8 + 2^9 + 2^{10} + 2^{11} + 2^{12} + 2^{13} + 2^{14} + 2^{15} = 65535$

Exercise 4: Drawing a Simple Flowchart



Exercise 5: Describing an Algorithm Using a Flowchart