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| Week | Reverse Engineering Malware | Duration |
| 1 | Basic Concepts | 120 mins |

Marks allocation: 8/100 for CA practical submission

**Lesson Objectives**

* Understand Data Representation and Boolean Expressions

**Note: All calculations should be done manually.**

1. In an 8-bit binary number, which is the most significant bit (MSB)? **Most significant bit (the highest numbered bit).**

2. What is the decimal representation of each of the following unsigned binary integers?

a. 00110101

b. 10010110

c. 11001100

**(a) 53 (b) 150 (c) 204**

3. What is the sum of each pair of binary integers?

a. 10101111 + 11011011

b. 10010111 + 11111111

c. 01110101 + 10101100

**(a) 110001010 (b) 110010110 (c) 100100001**

4. Calculate binary 00001101 minus 00000111.

**00000110**

5. How many bits are used by each of the following data types?

a. word

b. doubleword

c. quadword

d. double quadword

**(a) 16 (b) 32 (c) 64 (d) 128**

6. What is the minimum number of binary bits needed to represent each of the following unsigned decimal integers?

a. 4095

b. 65534

**(a) 12 (b) 16**

7. What is the hexadecimal representation of each of the following binary numbers?

a. 0011 0101 1101 1010

b. 1100 1110 1010 0011

**(a) 35DA (b) CEA3**

8. What is the binary representation of the following hexadecimal numbers?

a. 0126F9D4

**(a) 0000 0001 0010 0110 1111 1001 1101 0100**

9. What is the unsigned decimal representation of each of the following hexadecimal integers?

a. 3A

**(a) 58**

10. What is the unsigned decimal representation of each of the following hexadecimal integers?

a. 62

b. 4B3

**(a) 98 (b) 1203**

11. What is the 16-bit hexadecimal representation of each of the following signed decimal integers?

a. –24

b. –331

**(a) FFE8 (b) FEB5**

12. The following 16-bit hexadecimal numbers represent signed integers. Convert each to decimal.

a. 6BF9

b. C123

**(a) 27641 (b) −16093**

13. What is the decimal representation of each of the following signed binary numbers?

a. 10110101

**(a) −75**

14. What is the 8-bit binary (two’s-complement) representation of each of the following signed decimal integers?

a. –5

b. –42

**(a) 11111011 (b) 11010110**

15. Challenge: What is the largest decimal value you can represent, using a 129-bit unsigned integer?

**2^129 - 1**

END