CSC107 2.0 Computer Programming - Laboratory I
Lab sheet 05

To understand and practice the use of various operators in the C language, including arithmetic, assignment, comparison, logical, and bitwise operators through simplified real-world scenarios. Do not use conditional statements and loops.

1. What is the value of the *result*?
   a) int result =10 + 5 * 2 - 3 / 1;
   b int result = 5 < 10 > 3;
   c) int result = 1 && 0 || 1;
   d) int result = 5 & 3 | 2;
   e) int result = 3 + 5 * 2 > 10 && 7 % 2 == 1;
   f) int result = (3 + 5) * 2 > 10 && (7 % 2 == 1);
   g) int a = 3, b = 4, c = 5;
      int result = a + b * c - b / a & c | b;

2. What are the final values of *a* and *b* ?
   a) int a = 5;
      int b = 10;
      a += b *= 2;
   b) int a = 5; int b = -a++;

3. A company gives an annual bonus to its employees based on their monthly salary. The bonus is calculated as 5% of their total annual salary. Write a C program to calculate the annual bonus given a monthly salary.

4. An e-commerce website calculates the final price of a product after applying a discount and adding tax. Write a C program that takes the initial price, discount percentage, and tax percentage, then calculates and prints the final price.

5. A bank updates the balance of an account with interest. If the initial balance is 5000, and the annual interest rate is 3%, write a C program to calculate the balance after 1 year using compound assignment operators.

6. A person saves a fixed amount of money every month. Write a C program to calculate the total savings after 12 months if the monthly saving is 200 dollars. Use compound assignment operators.

7. A fitness app determines if a user has met their daily step goal. The goal is 10,000 steps. Write a C program that takes the user's step count as input and prints a message (0 or 1) indicating whether the goal was met. Hint: 0 indicates not met, 1 indicates met.

8. A library system needs to check if a user can borrow a book. A user can borrow a book if they have no overdue books and have not exceeded the borrowing limit of 5 books. Write a C program that checks these conditions and prints whether the user can borrow a book. Hint: 0 indicates cannot borrow, 1 indicates can borrow.

9. A concert ticket system allows access only if the user is either a VIP member or has a ticket. Write a C program that checks if the user can access the concert. Hint: 0 indicates cannot access, 1 indicates can access.

10. An embedded system uses a 4-bit value to control different components. Each bit represents whether a component is on (1) or off (0). Write a C program that sets the third component (bit 2) to 1 (on) without changing other bits. Assume the initial state is 0101 (binary). New control states can be present in decimal as below.

    Sample outcome:

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    New control state: 7
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