

C Programming

CSE 107

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November 7, 2024

Assembly Code

- `load R0, 3`
- `load R1, 4`
- `load R2, 1`
- `load RF, 30`
- `addi R3, R3, R2`
- `addi R5, R5, R1`
- `jump R3 = R0, 8`
- `jmp 4`
- `Halt`

Assembly Code

- load R0, 3 $R0 = 3$
- load R1, 4 $R1 = 4$
- load R2, 1 $R2 = 1$
- addi R3, R3, R2 $R3 = R3 + R2$
- addi R5, R5, R1 $R5 = R5 + R1$
- jump R3 = R0, 7 go to step 7 if $R3 = R0$
- jmp 3 go to step 3
- Halt terminate

Translated C Code

```
#include <stdio.h>

int main() {
    int n1 = 3;
    int n2 = 4;
    int result = 0;
    int i;
    for (i = 0; i < n1; i++) {
        result = result + n2;
    }
    printf("%d x %d = %d", n1, n2, result);
    return 0;
}
```

Consider the following C code that is intended to swap the values of two variables, X and Y:

```
int main() {  
    int X = 5, Y = 10;  
  
    printf("Before swapping: X = %d, Y = %d\n", X, Y);  
  
    // Swap algorithm  
    X = Y;  
    int temp = X;  
    Y = temp;  
  
    printf("After swapping: X = %d, Y = %d\n", X, Y);  
  
    return 0;  
}
```

- 1. What is the expected output of the code above?**
 - A) X = 5, Y = 10
 - B) X = 10, Y = 5
 - C) X = 10, Y = 10
 - D) X = 5, Y = 5
- 2. Does the algorithm successfully swap the values of X and Y? If not, what is the problem?** - Explain why the algorithm does not work as expected.
- 3. What change should be made to the code to fix the issue and successfully swap the values of X and Y?** - Describe or write the corrected code.
- 4. What will be the output of the program after fixing the swap algorithm?**
 - A) X = 5, Y = 10
 - B) X = 10, Y = 5
 - C) X = 10, Y = 10
 - D) X = 5, Y = 5

1. What is the expected output of the code above?
C) $X = 10, Y = 10$
2. Does the algorithm successfully swap the values of X and Y ? If not, what is the problem? The algorithm does not successfully swap the values because the original value of X is overwritten before it can be stored in `temp`.
3. What change should be made to the code to fix the issue and successfully swap the values of X and Y ? - Describe or write the corrected code.
4. What will be the output of the program after fixing the swap algorithm?
B) $X = 10, Y = 5$

The End