

EE 107 Homework 4: due Tuesday, Feb. 27 before class

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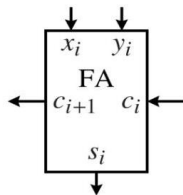
- 1). Analyze the following program, and explain in detail what the program does.
- 2). Add a print statement to print out the k values after the inner for-loop.
- 3). List the first four printed k values which are corresponding to $i=1, 2, 3, 4$.

```
int main (void)
{
    int i, j, k;
    for (i = 1; i <= 10; i++) {
        k = 1;
        for (j = 1; j <= i; j++) {
            k = k*j;
        }

    }

    return 0;
}
```

2. With the following 1-bit full adder, layout a 6 bit adder-subtractor combination.
Give two examples one for addition, and one for subtraction, detail the device operations.



3. Using switch-case statement to develop a program that acts as a simple “printing” calculator. The program should allow the user to type in expressions of the form

number operator number

The following two operators should be recognized and accepted by the program:
+ and - (addition, subtraction)

The operations should be on float numbers.

4. Using if-else statement re-write the above program.

5. 1). Explain the difference between the break statement and the continue statement.
2). For expression `!a || b && c || d`, list the order of program evaluation.

6. We have a multidimensional array declared as such:

```
int m[3][2]={ 1, 2, 3, 4, 5, 6};
```

What is the mathematical matrix defined by the array `m[3][2]`?

Also, what are the indices for the array element 4? (or if `m[i][j]` is 4, then what is `i` and what is `j`?)

Similarly, if we have an array that models time as the following,

```
float t[100];
```

If `N` is the size of the array, what is `N`?

Write a program to assign `t[100]` the `N` values that starts from 20 seconds and steps every 2 seconds i.e., the values would be 20, 22, 24, (hint: using for-loop).

7. Write a program that will enter 100 user inputs (using for-loop) and use if-else-if that can convert the input numeric score to a letter grade (conversion rules attached below). The grades will be saved in a character array `char letterGrade[100]`; Also, include a counter array so that the number of A's, B's, C's, D's, and F's will be stored in the array.
Conversion rules: 90 or more → A; 80 - 90 → B; 70 - 80 → C; 60 - 70 → D; Below 60 → F.