16.216: ECE Application Programming

Spring 2013

Lecture 10: Key Questions
February 15, 2013

1. **Example:** What does each of the following print?

a.
```
int i = 0;
while (i < 30) {
   if ((i % 3) == 0)
        printf("%d\n", i);
   i = i + 2;
}
```

b. *Assume input is: 3 8 -4 -7 0 5 2*
```
do {
   scanf("%d\n",&x);
   printf("x = %d, x/2 = %d\n", x, x/2);
} while ((x > 2) || (x < 0));
```

c. *Assume input is: b c d e f g h*
```
char c = 'a';
while (c != 'h') {
   printf("%c", c);
   scanf("%c", &c);
}
```

In today's exercise, you will start writing a program that does the following:

- Prompts the user to enter a single input character followed by an integer, `n`.
  - If not correctly formatted, print error, clear rest of line, and repeat prompt
- Depending on the character entered, do the following:
  - '`F`' or '`f`': Compute and print the factorial of `n`, `n!`
    - For example, if the user enters **`F 5`**, print **`5! = 120`**
    - **We'll worry about the actual process for the factorial later.**
  - '`P`' or '`p`': Compute 2^n, but only if `n >= 0`.
    - For example, if the user enters **`p 2`**, print **`2^2 = 4`**
    - Print an error if `n < 0`.
    - **We'll worry about the actual process for the exponent later.**
  - '`X`' or '`x`': Exit the program
  - In all other cases, print an error:
    - For example: `Invalid command Z entered`
- If the user enters any command other than '`X`' or '`x`', return to the initial prompt and repeat the program.

Steps in the programming exercise:

1. Draw a general flowchart for the overall program flow.
   - Treat each of the processes listed in part 2 as a single block—don't worry about the details just yet.
2. Draw smaller flowcharts for each of the following processes:
   - Reading the input character & integer until correct.
   - Computing n!
   - Computing 2^n if n >= 0 and printing an error otherwise.
3. Convert the flowcharts to actual code (time permitting).
   - You can write flowcharts for n! and 2^n; we'll finish the code at a later date

Space to draw flowchart of overall program flow:

Flowchart for reading input character until correct: