

CSE142 Computer Programming I

Following the Way: Program Style

...or, How to Be Like Hannah

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Foundations of Style: Whence The Way?

A program is a document:

- *Some* of it is read by a computer.
- *All* of it is read by people.

“Style” is a catch-all term for *people*-oriented programming encompassing all documentation:

- comments, spacing, indentation, names, clear & straightforward & well-organized code

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Style “Extremism”: Literate Programming

...we can best achieve this [better documentation] by considering programs to be works of literature... Instead of imagining that our main task is to instruct a computer what to do, let us concentrate rather on explaining to human beings what we want a computer to do.

-Donald Knuth

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Lay it on me... Why doesn't style matter?

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But, I don't need good style because the *computer* doesn't!

Remember the “obfuscated” code?

The computer “understands” fundamentally differently from you!

Just because code is executable, doesn't mean it's comprehensible.. even to the author!

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Understanding Your Own Code

```
/* Assigning a value to the pizza door to be shown */
/* the situation that the contestant picks the cable door */
if (cable_door == choice_door){
    if (pizza_door != choice_door){
    }else{
        pizza_door = random_int(3) + 1;
    }
}
if (pizza_door != choice_door)
{
    pizza_door = pizza_door;
}else{
    pizza_door = random_int(3) + 1;
}
if (pizza_door != choice_door)
{
    pizza_door = pizza_door;
}
}
```

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But *now*, my bare code is crystal clear to others!

...the code itself... is something we can run but not exactly understand... Even if you have the source code in front of you, there are limits to what a human reader can absorb from thousands of lines of text designed primarily to function, not to convey meaning.

-Ellen Ullman (programmer of 20 years)

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And again...

It is the difference between performing and exposing a magic trick.

-Ross Williams

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But, my documentation tells *exactly* what the code does!

```
/* subtract one from sheep */  
sheep = sheep - 1;
```

```
/* account for the sheep that  
the big bad wolf just ate */  
sheep = sheep - 1;
```

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But, *my* style is better than {yours, this code's, everyone's}

```
/* init the double-buffer windows */  
the_hdc = GetDC(hDrawWnd);  
offscreen_bitmap =  
    CreateCompatibleBitmap(the_hdc,  
        2*GP142_XMAX+1, 2*GP142_YMAX+FUDGE);  
offscreen_DC = CreateCompatibleDC(the_hdc);
```

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But, this code is so elegant, no one could *fail* to understand it!

```
reveal_door =  
(prize_door == door_choice) * (door_choice + random_int(2) + 1) +  
(prize_door != door_choice) * (6 - prize_door - door_choice);
```

```
reveal_door = (reveal_door - 1) % 3 + 1;  
switch_door = 6 - reveal_door - door_choice;
```

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But this code is solely for me... no one will ever look at it again!

Y2K

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So, what is The Way?

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Documentation that bites back

- assert in C
- auto-documentation in Java

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Syntactic “Salt” (and the Python language)

```
def left_child(self, location):  
    child = location * 2 + 1  
    if child >= self.pairs_size:  
        return None  
    else:  
        return child
```

*So... indentation is syntactic salt in Python.
But Python doesn't have types... therefore?*

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Style Summary: The Way, Our Way

DO

- Use plenty of comments - but not too many
- Use white space
- Use indentation
- Choose descriptive names
- Use named constants

DON'T

- be terse, tricky
- place speed above correctness, simplicity
- use “magic numbers”

Clarity is Job #1!

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QOTD: Guerilla Style Wars

Think of a common bug/problem you have in your code.

Now try to imagine a *stylistic* convention that would overcome that.

Example:

- I might often type = rather than ==.
- If I never write (x == 3) but instead always write (3 == x), the compiler will find my bug!

*Is the 3 == x convention really good style? Would it really help?
What about your convention?*

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