

1.12 Why whitespace matters

Whitespace and precise formatting

For program output, **whitespace** is any blank space or newline. Most coding activities strictly require a student program's output to exactly match the expected output, including whitespace. Students learning programming often complain:

"My program is correct, but the system is complaining about output whitespace."

However, correctness often includes output being formatted correctly.

PARTICIPATION ACTIVITY

1.12.1: Precisely formatting a meeting invite.

Start

☐ 2x speed

Kia Smith is inviting you to a video meeting.

Join meeting:
http://www.zoomskype.us/5592

Phone:
1-869-555-2634 (San Jose)
1-929-555-4000 (New York)

Meeting ID: 5592

Reminder: 10 min before

Kia Smith is inviting you to a video meeting. Join meeting:

http://www.zoomskype.us/5592 Phone:
1-869-555-2634 (San Jose)
1-929-555-4000 (New York)

Meeting ID: 5592

Reminder: 10 min before

Captions

Feedback?

PARTICIPATION ACTIVITY

1.12.2: Program correctness includes correctly-formatted output.

Consider the example above.

1) The programmer on the left intentionally inserted a newline in the first sentence, namely "Kia Smith ... video meeting". Why?

Probably a mistake

So the text appears less jagged

To provide some randomness to the output

2) The programmer on the right did not end the first sentence with a newline. What effect did that omission have?

"Join meeting" appears on the same line

No effect

3) The programmer on the left neatly formatted the link, the "Phone:" text, and phone numbers. What did the programmer on the right do?

Also neatly formatted those items

Output those items without neatly formatting

4) On the right, why did the "Reminder..." text appear on the same line as the separator text "-----"?

Because programs behave erratically

Because the programmer didn't end the output with a newline

5) Whitespace ____ important in program output.

is

is not

Feedback?

Programming is all about precision

Programming is all about *precision*. Programs must be created precisely to run correctly. Ex:

- = and == have different meanings.
- Using i where j was meant can yield a hard-to-find bug.
- Declaring a variable as int when char was needed can cause confusing errors.
- Not considering that n could be 0 in sum/n can cause a program to fail entirely in rare but not insignificant cases.
- The difference between typing x/2 vs. x/2.0 can have huge impacts.
- Counting from i being 0 to i < 10 vs. i <= 10 can mean the difference between correct output and a program outputting garbage.

In programming, every little detail counts. Programmers must get in a mindset of paying extreme *attention to detail*.

Thus, another reason for caring about whitespace in program output is to help new programmers get into a "precision" mindset when programming. Paying careful attention to details like whitespace instructions, carefully examining feedback regarding whitespace differences, and then modifying a program to exactly match expected whitespace is an exercise in strengthening attention to detail. Such attention can lead programmers to make fewer mistakes when creating programs, thus spending less time debugging, and instead creating programs that work correctly.

PARTICIPATION ACTIVITY

1.12.3: Thinking precisely, and attention to detail.

Programmers benefit from having a mindset of thinking precisely and paying attention to details. The following questions emphasize attention to detail. See if you can get all of the questions correct on the first try.

1) How many times is the letter F (any case) in the following?
If Fred is from a part of France, then of course Fred's French is good.

Check

Show answer

2) How many differences are in these two lines?
Printing A linE is done using printn
Printing A linE is done using print1n

Check

Show answer

3) How many typos are in the following common phrase?
Keep calmn and cary on.

Check

Show answer

4) If l and E are adjacent, l should come before E, except after C (where E should come before l). How many violations are in the following?
BEIL
CEIL
ZIEL
YIEIK
TREIL

Check

Show answer

5) A password must start with a letter, be at least 6 characters long, include a number, not include any whitespace, and include a special symbol. How many of the following passwords are valid?
hello
goodbye
Maker1
dog!three
Oops_again
1augh#3

Check

Show answer

Feedback?

CHALLENGE ACTIVITY

1.12.1: Whitespace and attention to detail.

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Start

The following code contains at least one whitespace error. Find and fix the error(s) so the program reads numHandbags from input, and outputs "The filmmaker wants " followed by numHandbags, " handbags.", and a newline.

Ex: If the input is 7, then the output is:

The filmmaker wants 7 handbags.

```
1 #include <iostream>
2 using namespace std;
3
4 int main() {
5     int numHandbags;
6
7     cin >> numHandbags; // Reads numHandbags from input
8
9     cout << "The film maker wants " << numHandbags << " hand bags." << endl;
10
11     return 0;
12 }
```

1

2

3

Check

Next level

Feedback?

Programmer attention to details

The focus needed to answer the above correctly on the first try is the kind of focus needed to write correct programs. Due to this fact, some employers give "attention to detail" tests to people applying for programming positions. Web search for "attention to detail in programming" for examples of such tests.

How was this section?

Provide section feedback

↓ 1.13 C++ example: Salary Calculation