

2.24 C++ example: Salary calculation with variables

Using variables in expressions, rather than numbers like 40, makes a program more general and makes expressions more meaningful when read too.

zyDE 2.24.1: Calculate salary: Generalize a program with variables and input.

The following program uses a variable `workHoursPerWeek` rather than directly using 40 in the salary calculation expression.

1. Run the program, observe the output. Change 40 to 35 (France's work week), and run again.
2. Generalize the program further by using a variable `workWeeksPerYear`. Run the program. Change 50 to 52, and run again.
3. Introduce a variable `monthlySalary`, used similarly to `annualSalary`, to further improve program readability.

Load default template...

```
1 #include <iostream>
2 using namespace std;
3
4 int main() {
5     int hourlyWage;
6     int workHoursPerWeek;
7     int annualSalary;
8
9     // TODO: Declare and initialize variable workWeeksPerYear, then replace the 50's below
10
11     hourlyWage = 20;
12     workHoursPerWeek = 40;
13
14     annualSalary = hourlyWage * workHoursPerWeek * 50;
15     cout << "Annual salary is: ";
16     cout << annualSalary << endl;
17
18     cout << "Monthly salary is: ";
```

Run

Feedback?

When values are stored in variables as above, the program can read user inputs for those values. If a value will never change, the variable can be declared as `const`.

zyDE 2.24.2: Calculate salary: Generalize a program with variables and input.

The program below has been generalized to read a user's input value for `hourlyWage`.

1. Run the program. Notice the user's input value of 10 is used. Modify that input value, and run again.
2. Generalize the program to get user input values for `workHoursPerWeek` and `workWeeksPerYear` (change those variables' initializations to 0). Run the program.
3. `monthsPerYear` will never change, so declare that variable as `const`. Use the standard for naming constant variables. Ex: `const int MAX_LENGTH = 99`. Run the program.
4. Change the values in the input area below the program, and run the program again.

Load default template...

```
1 #include <iostream>
2 using namespace std;
3
4 int main() {
5     int hourlyWage;
6     int workHoursPerWeek;
7     int workWeeksPerYear;
8     int monthsPerYear;    // FIXME: Declare as const and use standard naming
9     int annualSalary;
10    int monthlySalary;
11
12    cout << "Enter hourly wage: " << endl;
13    cin >> hourlyWage;
14
15    // FIXME: Get user input values for workHoursPerWeek and workWeeksPerYear
16    workHoursPerWeek = 40;
17    workWeeksPerYear = 50;
18
```

10

Run

Feedback?