Surprises with Different C/C++ Implementations and a Quizzical MAPLE Example (Two Short Case Studies in Programming)

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The C/C++ language has different implementations (Microsoft Visual C++, GNU C++, BorlandC++, Dev-C++,...). The C/C++ language is known as a creditable, well defined one. So the output of the program detail below can be a little bit unexpected:

```
void kiiro(int a, int b, int c, int d, int e, int f);
void main(){
int i=3;
kiiro(i,++i,i++,++i,++i,i);
}
void kiiro(int a, int b, int c, int d, int e, int f)
{printf("%d %d %d %d %d %d\n",a,b,c,d,e,f); }
```

When we compile and run it with different C/C++ implementations, the outputs will be different. As first case study we examine this phenomenon at assembly level using the development environment provided by vendors. The differences are well traceable on obtained ASSEMBLY sources. Moreover trying to calculate the next or some similar expression

```
a=i + i++ + ++i + i++;
```

we can get new sudden results. As a second case we present an effect in MAPLE. Why give these lines (see below the line with $B =$) syntactically good but semantically quite different results (that is, the result is wrong in one of them)?

$$> E := a \cdot \left[\left[1 - \frac{(\cos(v))}{u^2} \right] \cdot (2 \cdot f^2 + f) + \frac{(1+4s)}{u^2} \frac{(\cos(v))}{u^2} \right]$$

$$> B := \frac{(3*f^2 + f)}{4} - \frac{(1+4s)^2}{1-u^2} - 2a\left(1 + \left(3 + \frac{(\cos(b))^2}{u^2}\right)s\right):$$

$$\quad (-B + sqrt(B^2 - 2k \cdot E))$$

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We have got the reason of this strange behavior in a very special way.

Concrete results: Different C/C++ compilers can give different result for the same source code.

References

[1] Geddes K., Labahn G., Monagan M.:Maple 12 Advanced Programming Guide, Maplesoft 2008, ISBN:978-1-897310-47-2

[2] Josuttis N. M.: The C++ Standard Library: A Tutorial and Reference, Addison-Wesley Professional; 1 edition (August 22, 1999), ISBN-13: 978-0201379266