

Filling a vector of pairs

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I want to fill a vector with 8 pairs.
Each pair represents the moves in x
and y coordinates a knight in a game
of chess can make. At the moment
I'm doing it like this

```
vector<pair<int,int>> moves;

pair<int,int> aPair;
aPair.first = -2;
aPair.second = -1;
moves.push_back(aPair);
aPair.first = -2;
aPair.second = 1;
moves.push_back(aPair);
aPair.first = -1;
aPair.second = -2;
moves.push_back(aPair);
aPair.first = -1;
aPair.second = 2;
moves.push_back(aPair);
aPair.first = 1;
aPair.second = -2;
moves.push_back(aPair);
aPair.first = 1;
aPair.second = 2;
moves.push_back(aPair);
aPair.first = 2;
aPair.second = -1;
moves[6].push_back(aPair);
aPair.first = 2;
aPair.second = 1;
moves.push_back(aPair);
```

I'm doing this to learn about the Std
library. This seems like a hopelessly
inefficient way of solving this problem.

Anyone have a more elegant
solution?

c++ stl

edited May 3 at 12:15

asked Nov 15 '12 at 21:46



Q-bertsuit

1,001 3 12 24

- 4 first observation: use
moves[0].push_back(std::mak
e_pair(-2, -1)); second
observation: You have 8 vectors
not ans [answered May 15 '12 at](#)

8 Answers

Loops to the rescue:

```
for(int k = 0; k < 2; k++)
  for(int i = -1; i < 2; i += 2)
    for(int j = -1; j < 2; j += 2)
      result.push_back(make_pair(i, j));
```

Output: <http://ideone.com/2B0F9b>

answered Nov 15 '12 at 23:08



[hate-engine](#)

1,729 10 26

Wow that's a really nice solution.
Thanks! – [Q-bertsuit](#) Nov 16 '12 at 19:22



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If you have C++11 (otherwise you can't write `>>`), you can use the following:

```
vector<pair<int,int>> moves = {
    {-2, -1},
    {-2, 1},
    {-1, -2},
    {-1, 2},
    { 1, -2},
    { 1, 2},
    { 2, -1},
    { 2, 1}
};
```

answered Nov 15 '12 at 21:52



[ipc](#)

7,094 21 29

You need an additional pair of braces around each pair of numbers, the inner one performs aggregate initialization of the `std::pair` and the outer one is required for the `vector` constructor. – [Praetorian](#) Nov 15 '12 at 21:56

@Praetorian: `std::pair<>` is not an aggregate, that is a constructor call. – [ildjarn](#) Nov 15 '12 at 21:59

@ildjarn Hmm, always assumed it was. But gcc 4.7.0 is complaining

I don't have c++11, but thank you for posting! – [Q-bertsuit](#) Nov 16 '12 at 19:23

In C++98/03:

```
moves.push_back(std::make_pair(-2,
```

In C++11:

```
moves.emplace_back(-2, -1);
```

Alternatively in C++11:

```
std::vector<std::pair<int, int>> m
```

answered Nov 15 '12 at 21:58



[Kerrek SB](#)

347k 58 649 886

If you don't have C++11 you can utilize [make_pair](#), pre-allocate the space for the vector without initializing the elements using `reserve`, and then utilize `push_back` without new allocations being done.

For example:

```
vector<pair<int, int> > moves;
moves.reserve(8);
moves.push_back(make_pair(-2, -1));
// and so on
```

Even if you have C++11 this technique is useful if you need to compute the elements on the fly rather than hard code them.

edited Nov 15 '12 at 21:59

answered Nov 15 '12 at 21:54



[Josh Heitzman](#)

1,696 1 10 26

Thank you for this. I already marked an answer, but I think it should have gone her. – [Q-bertsuit](#) Nov 16 '12 at 19:24

You're welcome! – [Josh Heitzman](#) Nov 16 '12 at 20:01

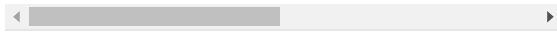
Initializer list together with Uniform Initialization gives a lot of power in C++11.

answered Nov 15 '12 at 21:54



Mateusz Pusz

1,015 6 15



Here's another method of doing the same thing.

```
template <class VectorClass>
class CreateVector
{
public:
    typedef typename VectorClass::value_type value_type;
    CreateVector(const value_type& value)
    {
        mVector.push_back(value);
    }

    CreateVector& operator()(const value_type& value)
    {
        mVector.push_back(value);
        return *this;
    }

    inline operator VectorClass() const
    {
        return mVector;
    }
private:
    VectorClass mVector;
};
```

Usage:

```
vector<pair<int,int>> moves = CreateVector<vector<pair<int,int>>>()
    (make_pair(1,2))
    (make_pair(2,3))
    (make_pair(3,4))
    (make_pair(4,5));
```

EDIT: Provided you're not using C++11, this would be one way. Otherwise, I would suggest to go the way @ipc suggested.

answered Nov 15 '12 at 22:01



Vite Falcon

5,566 1 21 43



If you're using C++11, you might want to consider `std::array` instead of `std::vector`. Like a normal array, the `std::array` has a fixed number of elements and makes more conceptual sense if you know in advance how much data you use.

answered Nov 15 '12 at 23:50



Alexander Duchene

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with loops:

```
vector<pair<int, int>> result;
for(int moveX=1; moveX<=2; moveX++)
{
    for(int signX=-1; signX<=1; signX++)
    {
        for(int signY=-1; signY<=1; signY++)
        {
            result.push_back(make_pair(moveX, signY*signX));
        }
    }
}
```

Full program produces the following vector:

```
{-1, -2},
{-1, 2},
{1, -2},
{1, 2},
{-2, -1},
{-2, 1},
{2, -1},
{2, 1},
```

answered Jul 31 '15 at 8:26



[Serge Rogatch](#)

5,412 2 29 57

