

SIMD Support

Type `VecElement{T}` is intended for building libraries of SIMD operations. Practical use of it requires using `llvmcall`. The type is defined as:

```
struct VecElement{T}
    value::T
end
```

It has a special compilation rule: a homogeneous tuple of `VecElement{T}` maps to an LLVM vector type when `T` is a primitive bits type.

At `-O3`, the compiler *might* automatically vectorize operations on such tuples. For example, the following program, when compiled with `julia -O3` generates two SIMD addition instructions (`addps`) on x86 systems:

```
const m128 = NTuple{4,VecElement{Float32}}

function add(a::m128, b::m128)
    (VecElement(a[1].value+b[1].value),
     VecElement(a[2].value+b[2].value),
     VecElement(a[3].value+b[3].value),
     VecElement(a[4].value+b[4].value))
end

triple(c::m128) = add(add(c,c),c)

code_native(triple, (m128,))
```

However, since the automatic vectorization cannot be relied upon, future use will mostly be via libraries that use `llvmcall`.