Homework 5:

1) *(1.0)* **Using C++ language, with SIMD (SSE) intrinsics and types create structure with name vector4 which hold 4 elements of type float and operate through SSE instructions. The public interface for that structure should look like the one provided below:**

```
struct vector4
{
public:
   vector4(float x, float y, float z);
   vector4(float x, float y, float z, float w);

public:
   float x() const;
   float y() const;
   float z() const;
   float w() const;
};
```

2) *(1.5)* **Extend the interface of the structure with methods add and sub which perform addition and subtraction of vectors:**

```
vector4& add(const vector4 &other);
vector4& add(float x, float y, float z);

vector4& sub(const vector4 &other);
vector4& sub(float x, float y, float z);
```

3) *(1.5)* **Extend the interface of the structure with methods mul and div which perform scale and inverse scale of vector by some scalar:**

```
vector4& mul(float scale);
vector4& mul(float scale, float w_scale);

vector4& div(float scale);
vector4& div(float scale, float w_scale);
```

4) *(1.0)* **Extend the interface of the structure with methods dot which perform dot product of vectors:**

```
vector4& dot(const vector4 &other);
vector4& dot(float x, float y, float z);
```

5) *(1.0)* **Extend the interface of the structure with methods magnitude and magnitude_square which returns magnitude of vector, and square of magnitude of vector.**

```
float magnitude() const;
float magnitude_square() const;
```

6) *(1.0)* **Extend the interface of the structure with methods normalize which normalize current vector:**

```
vector4& normalize();
```