```cpp
1   #pragma once
2
3   #include <vector>
4   #include <complex>
5   #include <cmath>
6   #include <valarray>
7   #include <array>
8   #include <deque>
9   #include <queue>
10  #include <iterator>
11  #include <algorithm>
12  #include <stdint.h>
13  #include <opencv2/core.hpp>
14  #include "SoilMathTypes.h"
15  #include "MathException.h"
16
17  namespace SoilMath
18  {
19      class FFT
20      {
21      public:
22          FFT();
23          ~FFT();
24
25          ComplexVect_t GetDescriptors(const cv::Mat &img);
26
27      private:
28          ComplexVect_t fftDescriptors;
29          ComplexVect_t complexcontour;
30          cv::Mat Img;
31
32          ComplexVect_t Contour2Complex(const cv::Mat &img, float centerCol, float centerRow);
33
34          iContour_t Neighbors(uchar *O, int pixel, uint32_t columns, uint32_t rows);
35
36          void fft(ComplexArray_t  &CA);
37          void ifft(ComplexArray_t &CA);
38
39      };
40  }
41
```