

Programming Assignment 2

CS 474

<https://github.com/alexander-novo/CS474-PA2>

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1 Correlation

1.1 Theory

1.2 Implementation

1.3 Results and Discussion

2 Averaging and Gaussian Smoothing

2.1 Theory

2.2 Implementation

2.3 Results and Discussion

3 Median Filtering

3.1 Theory

3.2 Implementation

3.3 Results and Discussion

4 Unsharp Masking and High Boost Filtering

4.1 Theory

4.2 Implementation

4.3 Results and Discussion

5 Gradient and Laplacian

5.1 Theory

5.2 Implementation

5.3 Results and Discussion

Code Listings

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Source code can also be found on the project's GitHub page: <https://github.com/alexander-novotny/CS474-PA2>. See previous assignments for common code (such as the `Image` class).

Listing 1: Implementation file for the `correlate` program.

```
1 // Q1-Correlation/main.cpp
2 #include <iostream>
3
4 #include "../Common/image.h"
5
6 int main(int argc, char** argv) {
7     std::cout << "Question 1: Correlation" << std::endl;
8
9     return 0;
10 }
```

Listing 2: Implementation file for the `smooth` program.

```
1 // Q2-Smoothing/main.cpp
2 #include <iostream>
3
4 #include "../Common/image.h"
5
6 int main(int argc, char** argv) {
7     std::cout << "Question 2: Averaging and Gaussian smoothing." << std::endl;
8
9     return 0;
10 }
```

Listing 3: Implementation file for the `median` program.

```
1 // Q3-Median/main.cpp
2 #include <iostream>
3
4 #include "../Common/image.h"
5
6 int main(int argc, char** argv) {
7     std::cout << "Question 3: Median filtering." << std::endl;
8
9     return 0;
10 }
```

Listing 4: Implementation file for the `unsharp` program.

```
1 // Q4-Unsharp/main.cpp
2 #include <iostream>
3
4 #include "../Common/image.h"
5
6 int main(int argc, char** argv) {
7     std::cout << "Question 4: Unsharp masking and High-Boost filtering." <<
8     ↪     std::endl;
9
10    return 0;
11 }
```

Listing 5: Implementation file for the `gradient` program.

```
1 // Q5-Gradient/main.cpp
2 #include <iostream>
3
4 #include "../Common/image.h"
5
6 int main(int argc, char** argv) {
7     std::cout << "Question 5: Gradient and Laplacian." << std::endl;
8
9     return 0;
10 }
```