Homework-2

Q1:

A picture containing crossword puzzle

Description automatically generated

The above picture is transformed by a geometric transformation. The (forward) description of this transformation is:

The pixel at coordinate (x, y) in the original picture moves to the location (6 – 3y, 6 – 2x) in the new picture.

A. Compute the transformed image using Nearest-Neighbor interpolation over the 2 × 2 window specified below:

|  |  |  |
| --- | --- | --- |
|  | x = 0 | x = 1 |
| y = 0 | (3, 2) | (3, 5/3) |
| y = 1 | (5/2, 2) | (5/2, 5/3) |

Round:

|  |  |  |
| --- | --- | --- |
|  | x = 0 | x = 1 |
| y = 0 | (3, 2) | (3, 2) |
| y = 1 | (3, 2) | (3, 2) |

|  |  |  |
| --- | --- | --- |
|  | x = 0 | x = 1 |
| y = 0 | 20 | 20 |
| y = 1 | 20 | 20 |

B. Compute the transformed image using Bilinear interpolation over the 2 × 2 window specified below:

|  |  |  |
| --- | --- | --- |
|  | x = 0 | x = 1 |
| y = 0 | (3, 2) | (3, 5/3) |
| y = 1 | (5/2, 2) | (5/2, 5/3) |

(3, 2) = 20, (2, 2) = 90, (3, 1) = 30, (2, 1) = 60

|  |  |  |
| --- | --- | --- |
|  | x = 0 | x = 1 |
| y = 0 | 20 | 23.33 |
| y = 1 | 55 | 51.67 |