

# TOPOLOGICAL WATERSHED Reference Manual

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# Chapter 1

## TOPOLOGICAL WATERSHED File Index

### 1.1 TOPOLOGICAL WATERSHED File List

Here is a list of all documented files with brief descriptions:

<b>heightminima.c</b> (H-minima operator ) . . . . .	3
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## Chapter 2

# TOPOLOGICAL WATERSHED File Documentation

### 2.1 heightminima.c File Reference

h-minima operator

#### 2.1.1 Detailed Description

h-minima operator

**Usage:** heightminima in.pgm connex h out.pgm

**Description:** The heightminima operator eliminates those regional minima which have a height less than the value **h**. The regional minima are defined with connexity **connex**.

**Types supported:** byte 2d, byte 3d

**Category:** connect

**Author:**

Michel Couprie

## 2.2 pgm2raw.c File Reference

suppress the header from a pgm file

### 2.2.1 Detailed Description

suppress the header from a pgm file

**Usage:** pgm2raw in.pgm out.raw

**Description:** suppress the header from a pgm file

**Types supported:** byte 2d, byte 3d

**Category:** convert

**Author:**

Michel Couprie



## 2.3 raw2pgm.c File Reference

converts from raw format into pgm format

### 2.3.1 Detailed Description

converts from raw format into pgm format

**Usage:** in.raw rs cs ds headersize nbytespervox littleendian [xdim ydim zdim] out.pgm

**Description:** Converts from raw format into pgm format.

Parameters:

- **in.pgm** : source file in raw format
- **rs** (int32\_t): row size (number of voxels in a row)
- **cs** (int32\_t): column size (number of voxels in a column)
- **ds** (int32\_t): number of planes
- **headersize** (int32\_t): size of the header in bytes (information in the header will be ignored)
- **nbytespervox** (int32\_t): number of bytes per voxel (1, 2 or 4)
- **littleendian** (int32\_t) 1: littleendian, 0: bigendian. Usual choice is 0.
- **xdim** (float, optional) : gap (in the real world) between two adjacent voxels in a row.
- **ydim** (float, optional) : gap (in the real world) between two adjacent voxels in a column.
- **zdim** (float, optional) : gap (in the real world) between two adjacent planes.

**Types supported:** byte 3D, int16\_t 3D, int32\_t 3D

**Warning:**

Signed integers are not supported.

**Category:** convert

**Author:**

Michel Couprie

## 2.4 watershed.c File Reference

topological binary watershed

### 2.4.1 Detailed Description

topological binary watershed

**Usage:** watershed in.pgm mark.pgm connex [i] out.pgm

**Description:** Topological watershed as defined in [CB97,CNB05].

The parameter **connex** indicates the connectivity of the minima. Possible choices are 4, 8 in 2d and 6, 26 in 3d.

A marker image is supplied in **mark.pgm**, see [CNB05a] for the role of this marker..

The result is a binary image, which is the complementary of the set of regional minima of the grayscale topological watershed.

If the parameter **i** is given, then the dual operator is applied.

References:

[CB97] M. Couprie and G. Bertrand: "Topological Grayscale Watershed Transformation", SPIE Vision Geometry V Proceedings, 3168 (136–146), 1997.

[CNB05] M. Couprie and L. Najman and G. Bertrand: "Quasi-linear algorithms for the topological watershed", Journal of Mathematical Imaging and Vision, Vol. 22, No. 2-3, pp. 231-249, 2005.

[CNB05a] M. Couprie and L. Najman and G. Bertrand: "Algorithms for the topological watershed", Discrete geometry for computer imagery, Springer, Vol. 3429, pp. 172-182, 2005.

**Types supported:** byte 2d, byte 3d

**Category:** connect

**Author:**

Michel Couprie

## 2.5 wshedtopo.c File Reference

topological grayscale watershed

### 2.5.1 Detailed Description

topological grayscale watershed

**Usage:** wshedtopo in.pgm connex [i] out.pgm

**Description:** Topological grayscale watershed as defined in [CB97,CNB05].

The parameter **connex** indicates the connectivity of the minima. Possible choices are 4, 8 in 2d and 6, 26 in 3d.

If the parameter **i** is given, then the dual operator is applied.

References:

[CB97] M. Couprie and G. Bertrand: "Topological Grayscale Watershed Transformation", SPIE Vision Geometry V Proceedings, 3168 (136–146), 1997.

[CNB05] M. Couprie and L. Najman and G. Bertrand: "Quasi-linear algorithms for the topological watershed", Journal of Mathematical Imaging and Vision, Vol. 22, No. 2-3, pp. 231-249, 2005.

**Types supported:** byte 2d, byte 3d

**Category:** connect

**Author:**

Michel Couprie