# <u>Crowding Class Definitions for Globular Clusters:</u> Andrew Layden – 2013 May

• The Crowding Class (*CC*) aims to index the degree to which a star's photometry may be compromised by nearby stars or the light of unresolved cluster stars. It ranges from 0=uncrowded to 4=severe.

• Consider two radii in relation to the *median FWHM* of the image set (you should display and analyze the *best*-seeing image of the set):

  i) **1*FWHM** is where two stars' DAOPHOT fitting radii begin to overlap and crowding becomes severe,

  ii) **3-4*FWHM** ~ PSF radius in DAOPHOT, two stars increasingly influence each other as their centers get closer than this distance.

• Both the *degree* by which a companion star is brighter or fainter than the target, and its proximity to the target, will influence the Crowding Class ranking.

• Several versions of the same image are displayed using different "stretch" in the grey-scale.

Outer Cluster Region:
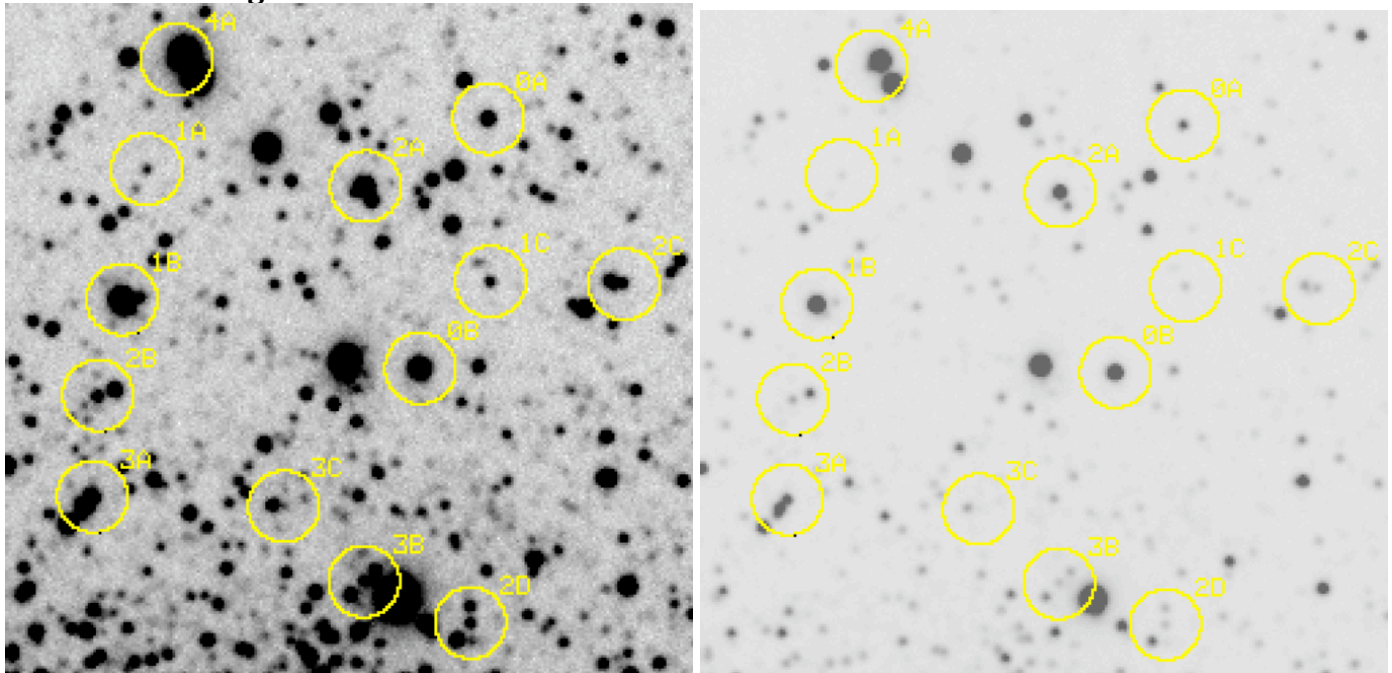
The sub-images shown are from an *I*-band image of NGC 6388 (Cardona et al. 2013) having *FWHM* = 3.0 pix. The circles have radius 13 pix, so the full area with *R* < 4*FWHM is visible inside each circle. The target star is at the center of each circle, and its Crowding Class (*CC*) is described below.

ID#	CC	Notes
0A	0	Isolated; *photometry is trustworthy*.
0B	0	Isolated.
1A	1	A faint star with one, fainter, rather distant companion; *photometry is trustworthy*.
1B	1	A bright star with one, much fainter companion at moderate distance.
1C	1	Similar to 1A.
2A	2	A bright star with two fainter stars close by; *photometry may be affected*.
2B	2	A brighter companion is close to the target, fainter stars are present inside 4*FWHM.
2C	2	A brighter companion is very close to the target.
2D	2	Several bright stars are at moderate distance from the target.
3A	3	A brighter star is very close, blended with the target; *photometry is probably affected*.
3B	3	Two stars of comparable magnitude are close, and a very bright star is at 4*FWHM.
3C	3	Two stars of comparable magnitude are close, and a very bright star is close by.
4A	4	Faint star close to much bright star; *photometry is not trustworthy*.

Inner Cluster Region:
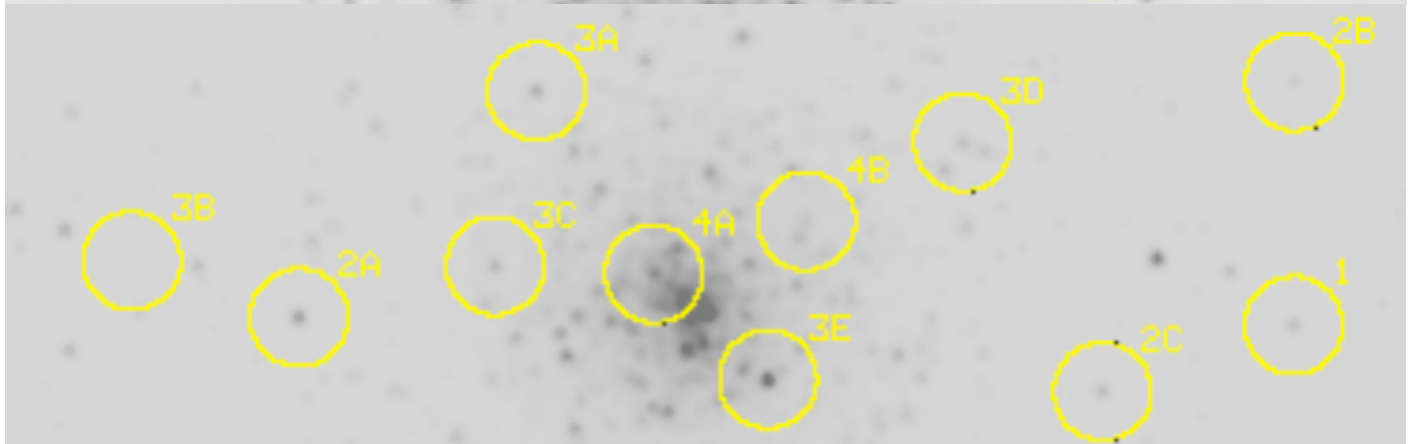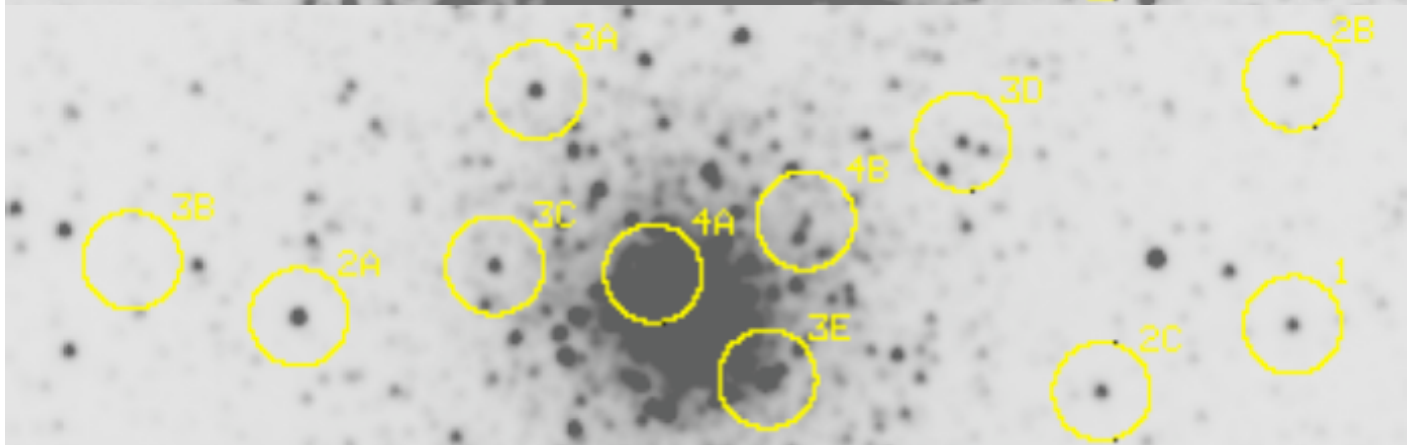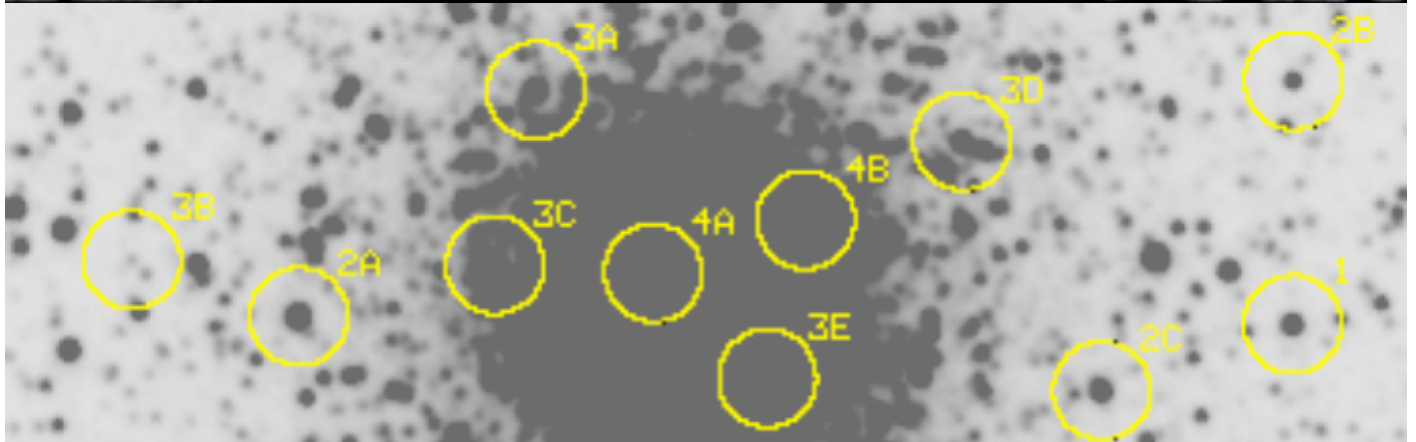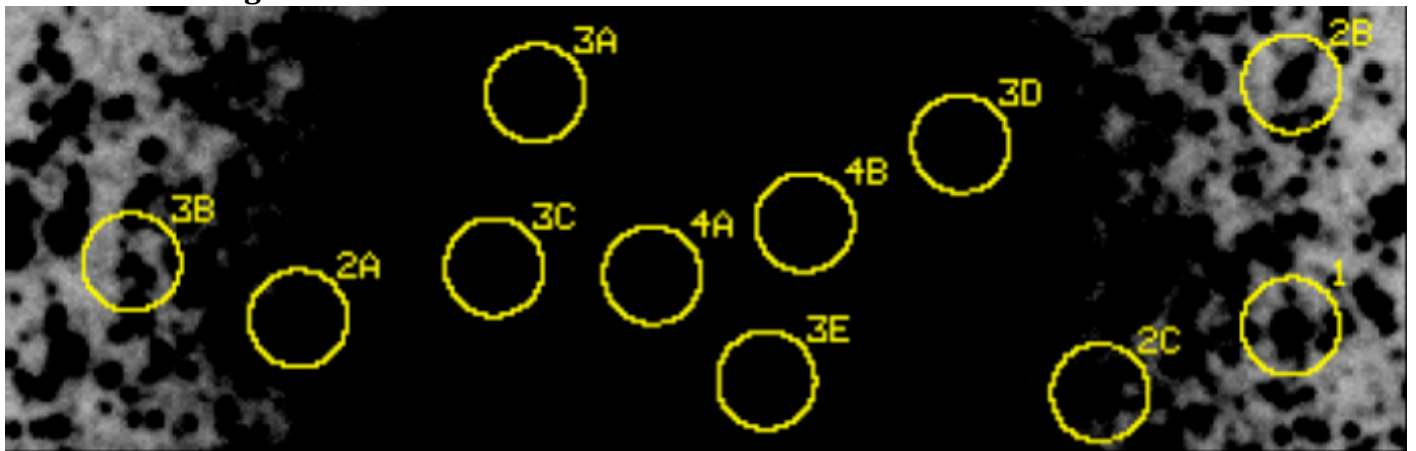
ID#	CC	Notes
-	0	Background light from unresolved cluster stars fills the field, no stars have $CC=0$.
1	1	A bright star with little influence from resolved stars; *photometry is trustworthy*.
2A	2	Fainter companion stars, bright background; *photometry may be affected*.
2B	2	Fainter companion, distant bright star, moderate background.
2C	2	Fainter companions, moderate background.
3A	3	Fainter companions, bright background; *photometry is probably affected*.
3B	3	Faint target star with brighter companion. Background is high relative to target star.
3C	3	Fainter companions, heavy background.
3D	3	Two companions with similar brightness, high background.
3E	3	Bright star in heavy background with several fainter companions.
4A	4	Badly blended and very bright background; *photometry is not trustworthy*.
4B	4	Fainter star with close, brighter companion, though farther from blended cluster center