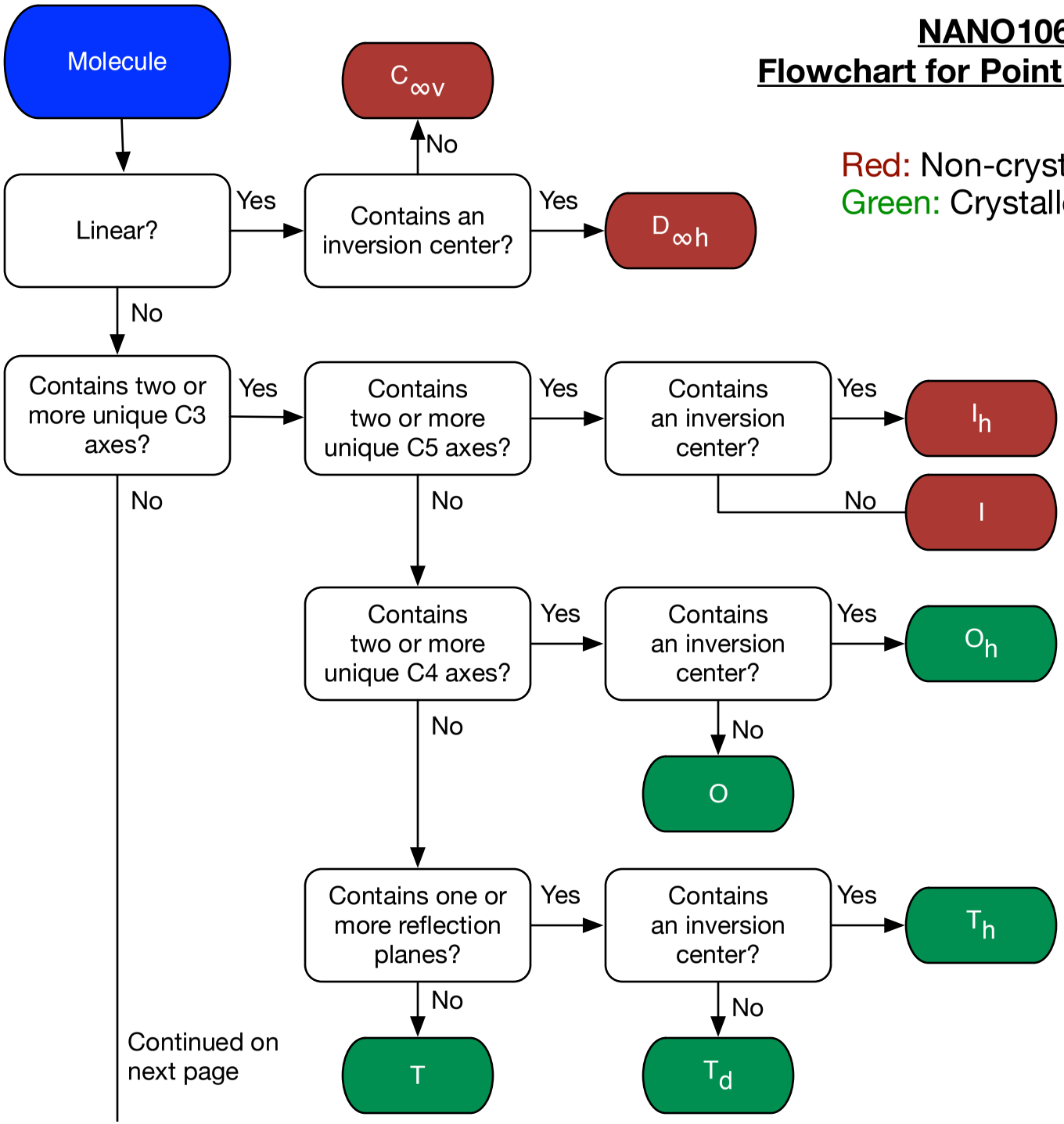
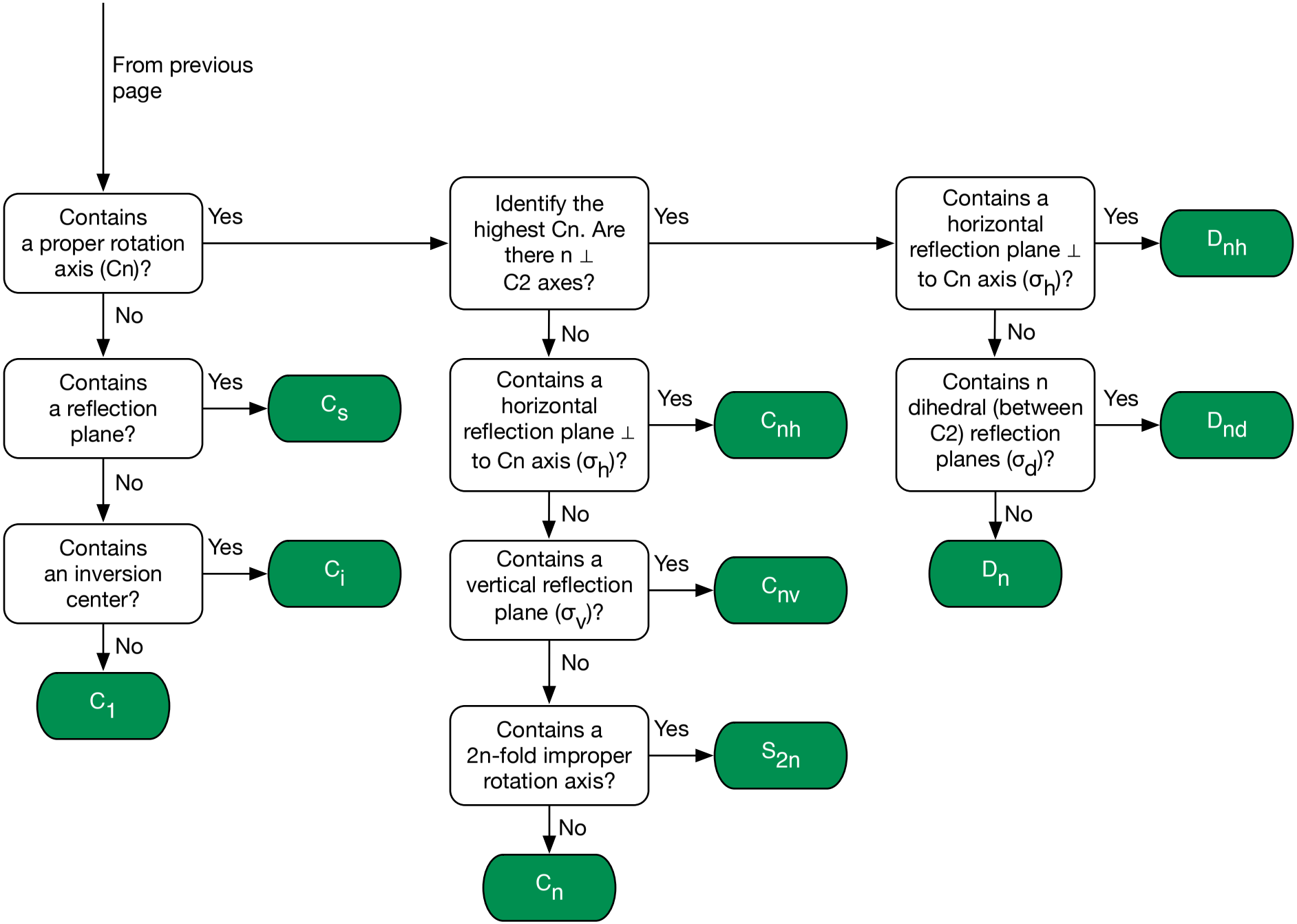
Table 1: The 32 Crystallographic Point Groups

Crystal System	**Laue Class**	**Hermann-Mauguin Full**	**Hermann-Mauguin Short**	**Schoenflies**
Triclinic	$\bar{1}$	1	1	C_1
		$\bar{1}$	$\bar{1}$	$C_i = S_2$
Monoclinic	$\frac{2}{m}$	2	2	C_2
		m	m	$C_s = C_{1h}$
		$\frac{2}{m}$	$\frac{2}{m}$	C_{2h}
Orthorhombic	mmm	222	222	D_2
		$mm2$	$mm2$	C_{2v}
		$\frac{2}{m}\frac{2}{m}\frac{2}{m}$	mmm	D_{2h}
Tetragonal	$\frac{4}{m}$	4	4	C_4
		$\bar{4}$	$\bar{4}$	S_4
		$\frac{4}{m}$	$\frac{4}{m}$	C_{4h}
	$\frac{4}{m}mm$	422	422	D_4
		$4mm$	$4mm$	C_{4v}
		$\bar{4}2m$	$\bar{4}2m$	D_{2d}
		$\frac{4}{m}\frac{2}{m}\frac{2}{m}$	$\frac{4}{m}mm$	D_{4h}
Trigonal	$\bar{3}$	3	3	C_3
		$\bar{3}$	$\bar{3}$	C_{3i}
	$\bar{3}m$	32	32	D_3
		$3m$	$3m$	C_{3v}
		$\bar{3}m$	$\bar{3}m$	D_{3d}
Hexagonal	$\frac{6}{m}$	6	6	C_6
		$\bar{6}$	$\bar{6}$	C_{3h}
		$\frac{6}{m}$	$\frac{6}{m}$	C_{6h}
	$\frac{6}{m}mm$	622	622	D_6
		$6mm$	$6mm$	C_{6v}
		$\bar{6}m2$	$\bar{6}m2$	D_{3h}
		$\frac{6}{m}\frac{2}{m}\frac{2}{m}$	$\frac{6}{m}mm$	D_{6h}
Cubic	$m\bar{3}$	23	23	T
		$\frac{2}{m}\bar{3}$	$m\bar{3}$	T_h
	$m\bar{3}m$	432	432	O
		$\bar{4}3m$	$\bar{4}3m$	T_d
		$\frac{4}{m}\bar{3}\frac{2}{m}$	$m\bar{3}m$	O_h

NANO106 Handout 4
Flowchart for Point Group Determination

Red: Non-crystallographic point groups
Green: Crystallographic point groups




From previous page
Contains a proper rotation axis (Cn)?
Yes
No
Contains a reflection plane?
Yes
C_s
No
Contains an inversion center?
Yes
C_i
No
C_1
Identify the highest Cn. Are there n ⊥ C2 axes?
Yes
No
Contains a horizontal reflection plane ⊥ to Cn axis (σ_h)?
Yes
C_{nh}
No
Contains a vertical reflection plane (σ_v)?
Yes
C_{nv}
No
Contains a 2n-fold improper rotation axis?
Yes
S_{2n}
No
C_n
Contains a horizontal reflection plane ⊥ to Cn axis (σ_h)?
Yes
D_{nh}
No
Contains n dihedral (between C2) reflection planes (σ_d)?
Yes
D_{nd}
No
D_n