Computer Graphics MN1, Fall Semester 1995, Bo Nordin 951214 bosse@cb.uu.se
Reading Instructions

What you should know.
Concepts in **boldface** should be understood (the list may not be complete...).

Topic	Where??	Concepts/keywords
Uses	Foley 1.1	**user interface**, **CAD**, **multimedia**, **virtual reality**
History & Overview	Foley 1.2	**Sketchpad, pixel, voxel, wire-frame, bitmap, model (database), application pgm, graphics system, device**
Hardware	Foley 4	**vector** vs. **raster**, **addressability**, **resolution**, **pen plotter**, **laser printer**, **ink-jet printer**, **CRT**, **LCD**, **refresh, persistence, bandwidth, shadow-mask, pitch, (V)LUT**, **mouse** vs. **digitizer**, **interactive vs. image generating interaction devices**
Raster graphics, output	Foley 2.1	**primitive**, **attribute** (**aspect**), **(poly)line**, **(poly)marker**, **(filled) polygon**, **odd-parity rule**, **font**,
input	Foley 2.2	**logical input devices** (**locator, valuator, stroke, pick choice**, **string**), **request**, **sample**, **event, echo, prompt**
special	Foley 2.3	**WriteMode** (**RasterOp**), **bitBlt**, **pixBlt**
2D transformation	Foley 5.2-5.6	**matrix algebra**, **translation**, **scaling**, **rotation, homogeneous coordinates, compounding (concatenatation, composition) matrices, affine, shear, window-to-viewport**
2D clipping	Foley 3.8, 3.9, 3.11	**analytical**, **clip during scan conversion**, **trivial reject/accept**, **bounding box test**, **Cohen-Sutherland**, **Cyrus-Beck, Sutherland-Hodgman**
3D transformations	5.7-5.8	**right-handed system**, **rotation about x/y/z and about an arbitrary line,**
3D viewing	6.1-6.3	**perspective vs. parallel (oblique/ortographic)**, **COP**, **DOP**, **VRP, VRC, VUP, PRP, CW, NPC, view volume**, **front (back) clipping plane, 3D viewport,**
	6.5	**perspective/parallel projection matrices**
	6.6	**canonical view volume, NPC->viewport**
	6.6.1-3,5	$\mathbf{N_{par} = R\ T(-VRP)\ S_{par}\ T_{par}\ SH_{par}\ M_{VV3DV}}$ $\mathbf{N_{per} = R\ T(-VRP)\ M\ S_{per}\ SH_{par}\ T(-PRP)\ M_{VV3DV}}$
(cs=coordinate system)	6.7	**modeling (local) cs, WC (problem, application) cs, VRC cs, eye (camera) cs, normalized-projection (3D normalized device, 3D logical device) cs, screen (device, 2D screen) cs.** **modeling transformation, view orientation matrix, view mapping matrix**
Graphics standards	Foley 1.2 GL, GKS, PHIGS, PS	**immedidate vs. retained, portability**, **device/computer/language/programmer independent X, GKS, PHIGS, GL, SPHIGS**
Interaction/interfaces	Foley 8,notes	**HCI, API, GUI, UIMS, UIDE, BITs, CITs**
SPHIGS/PHIGS	Foley 7	**structure, traversal, polyhedron, modelling, viewing**
	(S)PHIGS	**posting/unposting, structure editing**
X/Motif	X	**window, client-server, window manager, X protocol: event&(round-trip) request & replies & errors, Xlib,**

		resources, properties, window attributes, X terminal, workstation, GC,visual, toolkit, Xt, widget, widget resource, callback, action, translation, widget class
Raster Graphics	Foley 3	**scan conversion, scissoring vs. analytical vs. copyPix**
...lines	Foley 3.2	**DDA, midpoint line, incremental, decision variable, endpoint order and..., clipping rectangle and..., varied slope and...**
...circles	Foley 3.3	**midpoint circle, 8-way symmetry, 2nd order diffs**
...filling	Foley 3.4-7	**spatial (span) & edge coherence, scan-line filling, seed filling, pattern filling, anchoring, thick primitves: replication, moving pen**
...text	Foley 3.12	**bitmap vs. curved outline**
...antialiasing	Foley 3.14	**aliasing&sampling, resolution increase, (un)weighted area sampling (prefilter), supersampling (postfilter)**
	AA	**support, scan conversion and ... (Gupta-Sproull)**
Grey-level devices	Foley 11.1	**dynamic range, halftoning, dithering, error diffusion**
Colour	Foley 11.2-11.3	**hue, saturation, brightness, dominant wavelength, cones and... (tristimulus theory), CIE (chromaticity diagram) X-Y-Z, illuminant C, additive, subtractive, RGB, CMY(K), YIQ, HSV, interpolation color quantization, LUT**
Curves	9.1-9.4	**solid modelling, polygon meshes, parametric repr. normals geometric/parametric continuity, Hermite, Bézier, B-spline, blending functions, convex hull, multiple control points, multiple knot**
Fractals	9.5, FR	**fractal dimension, self-similar, self-affine, Brownian motion, random, determinstic vs. statistical fractals, midpoint-displacement, Julia set, Mandelbrot set**
Visible surface determination	F13	**image vs. object precision, coherence(s), extent, bounding volume, back-face culling, z-buffer, scan-line VSD, VSD ray tracing, list-priority, depth-sort, Painter's, Warnock**
Illumination &Shading	F12, F14	**realism vs. informative images, ambient light, diffuse reflection, light-source attenuation, atmospheric dito, specular reflection, constant shading, Gouraud & Phong shading, recursive ray tracing**
Rendering pipeline	F14.9, S	**generation, traversal, transformation, scan conversion display**
Visualisation	VIS	**voxel, rendering (surface vs. volume)**
Images	IF	**GIF, TIFF, PBMPLUS, JPEG, compression**
Animation	F12.6	**MPEG, α-channels & α blending**

That's all...