Readings: Rama, chapter 4 (recommended: Kalat, module 6.3)

1. Visual Pathways

1.0. “Partial” perception
- patients have been encountered who
  - can’t see objects, but can reach for them easily
  - can’t reach for objects easily, but can see them
  - can’t see the colour of objects, but can see their form and motion
  - can’t see the motion of objects, but can see their form and colour
  - can’t see the form of objects, but can see their motion and colour
- possible explanation: experience is based on a set of visual pathways
  - if one is damaged while others are spared -> partial perception
  - consistent with what is known of neural basis of vision

1.1. Basic Systems (Pathways)

1. System for visual motor control: Tectopulvinar system (Tectopulvinar pathway)

   ![](Tecto-pulvinar_pathway.png)

   o control of automatic orienting behaviour (e.g. eye movements)
   o relatively early to develop, early to evolve

2. System for visual perception: Geniculostriate system (Geniculostriate pathway)

   ![](Geniculo-striate_pathway.png)

   o most aspects of visual perception
   o relatively late to develop, early to evolve
1.2. *Pathways of the Geniculostriate System*
- neurons from visual cortex (V1) branch out to parts of the *extrastriate cortex*

- connections between these areas create at least four **visual pathways**, each concerned with a different aspect of visual perception
  1. pathway for **form**
  2. pathway for **colour**
  3. pathway for **global motion**
  4. pathway for **depth**

1.3. *Streams of the Geniculostriate System*
- pathways can be grouped into two distinct **streams**
  1. **Ventral stream** (“*What*” stream)
     - pathways from V1 to temporal lobe (IT)
     - includes form and colour pathways
     - stream for conscious perception (?)
  2. **Dorsal stream** (“*How*” stream)
     - pathways from V1 to parietal lobe
     - includes motion pathways
     - stream for control of *voluntarily-initiated* actions

- summary of pathways, streams, and systems:
2 Visual Maps

- pathways have a special nature: a connected set of visual maps
- retina: input is like a (distorted) camera image
  - neighbouring cells in retina correspond to neighbouring parts of visual space
    - visual map
- visual maps also found in several brain areas: LGN, V1, V2, V3, V4

- areas specialized for vision are called **visual areas**
  - over 30 visual areas now known; some contain visual maps, others not
  - each areas specialized for just a few functions (e.g. colour perception)
- each visual pathway is formed of connected set of visual maps
  - handles one aspect of visual perception

3. Charles Bonnet Syndrome

- patients “see” objects (sometimes very strange ones) in parts of their visual field where they are blind
  - large scotomas
  - percept is sometimes “superreal”
  - percept is sometimes lacks depth
  - percept sometimes lacks motion
- possible explanation:
  - hypothesis formed at high levels isn’t contradicted by low-level information
  - if lesion is in one pathway, percept lacks that component
REAL-WORLD SEGMENT: Presentations I - Basics

- follows many of the same rules as for a written report
  1. tell a story
  2. keep it brief
  3. use proper format

A.3.1 Format for this Class
- 6 minutes + 2 minutes for questions
- overhead slides only
  o no computer/LCD presentations
  o blackboard not encouraged (too slow)
- start off with title slide
- set the general context
- “zoom in” to details of experiment
- “zoom out” to the big picture, implications
- Note: Purpose of the talk is not to convey information, but to get people interested
  o Effectiveness = content x style

A.3.2 Basics of Delivery (Verbal Style)
- always face the audience
- speak slowly and clearly
- speak loudly
- put the most important information at the end of a sentence
  o don’t fade out at the end of a sentence
- make eye contact with the audience
  o move from person to person
- show enthusiasm! 😊