11. Exercise sheet
Hand in solutions until Monday, 13 July 2009.

Any claim needs a proof or argument. Answer in complete sentences and your own words. A verbatim quote is never a complete answer.

Exercise 11.1 (Fingerprints). (12 points)

Analyze your own fingerprints. As a basis consider the webpage http://www.brazoria-county.com/sheriff/id/fingerprints/id-ncic.htm and its subpages.

(i) Classify each of your fingers into one of the categories (according to the FBI NCIC fingerprint classification):

- plain arch (AA),
- tented arch (TT),
- ulnar loop (01, . . . , 49),
- radial loop (51, . . . , 99),
- plain whorl (inner:PI, meeting:PM, outer:PO),
- central pocket whorl (inner:CI, meeting:CM, outer:CO),
- double loop whorl (inner:DI, meeting:DM, outer:DO),
- accidental whorl (inner:XI, meeting:XM, outer:XO),
- missing (XX), scarred or mutilated (SR), unable to classify (UC).

Start with your right thumb through to your right little finger and then continue from your left thumb to your left index finger.

My pattern is something like: 11 TT 03 04 03 05 55 TT 04 06.

(ii) Compare your pattern with the average values for arches (5%), loops (65%) and whorls (30%).

(In the tutorial we'll put together all our findings.)

(iii) Give a brief description (in your own words) for each of the preceding classes. [Consider number of deltas, or describe them as “looking like a combination of . . . , or think of a question like what would be a loop with 0 ridges between delta and core?]
Exercise 11.2 (Historical Development). (8 points)

Pick a country of your choice – other than the U.S. – who maintains an electronic database for fingerprints. Answer the following questions citing appropriate sources.

(i) Since when are fingerprints recorded digitally?
(ii) Which system was used to classify them originally? – Which system is used now?
(iii) Who is recorded in the database?
(iv) Who has access to the database?

Exercise 11.3 (Further Biometric Systems). (10 points)

Apart from the Identification by Fingerprint consider the following further technologies: Iris Recognition, Face Recognition, Speaker Verification. Pick one of them and answer the following questions.

(i) Think of a situation where the system of your choice is superior to all the others (including fingerprints).
(ii) What information would you store? The complete picture/sound or only certain characteristics? Be specific about your ideas.
(iii) How should then – in the identification process – an actual measurement be compared to the data in the database?
(iv) Find ways to fool the system and think of a tool to prevent that.