

Advanced Computer Skills syllabus

15 September 2009

Relational databases and Microsoft Access

Single-table databases: features of a database table, fields and records.

Multiple-table databases: information redundancy, space waste, relations, relational databases.

Relations: one-to-many, many-to-one, one-to-one, many-to-many, junction table, primary key and ID, referential integrity, foreign key. Temporal versus static databases

What is Access, Access' competitors.

MyFarm database example, Northwind database example, database file locking and security, Northwind database overview.

Automatic data save by Access, undo, non automatic object save for Access, how to backup database.

Tables: datasheet view, design view, field types (text, memo, number, currency, date/time, yes/no, OLE object, index, hyperlink), field properties (size, format, decimal digits, required, allow zero length, validation rule, validation text), table validation rule, building Access tables, importing data from Excel files.

Relationships: relationships' diagram, create/modify/delete relations, enforcing referential integrity. Create relations using Lookup Wizard, create predetermined lists using Lookup Wizard and using values taken from another table.

Forms: what is a form, create using wizard, view/add/modify/delete records, subform, form locking.

Query: what is a select query, create using wizard, design view, no-show option, sorting, criteria, criteria in And and Or, adding tables, adding fields, creating virtual fields, Expression Builder (DATE, DATEDIFF, YEAR, LOG, ABS, SQR, EXP, INT, LIKE).

Summary query: group by option, count/sum/average/max/min options, using where option by for conditions.

Report: what is a report, create from tables or queries, create using wizard, grouping levels, sorting, export in RTF.

Database: how to create a database, paper diagram, tables, fields, relations, data, static versus temporal databases, technical documentation, what to include in a technical documentation.

Predictive Analytic Software (PASW-SPSS)

What is PASW-SPSS, PASW's competitors, cases and variables, data windows (data view, variable view), output window, how to export output objects, syntax window, how to paste syntax, how to run syntax.

PASW-SPSS version 17. Menus (file, edit, view, data, transform, analyze, graph, windows, help), tutorials, case studies, statistics coach, icons, dialog recall, variables, insert case, insert variable, split file, weight file, select cases, value labels, how to put value labels in output.

Variables: questionnaire answers (open, single closed, multiple closed, multiple closed with other), name, variable label, type, value labels, measure (scale, ordinal, nominal).

Missing values: what causes missing values, how to code them, system missing values.

Data: insert data, import from text file, import from Excel file, merge files adding new cases, merge files adding new variables, aggregate variables, split file, select cases, weight cases, recode variables, compute variables, computer variables using boolean expressions, count variables, date/time wizard, replace missing values.

Analysis: normality assumption tests (histogram with normal curve, Skewness, Kurtosis, Q-Q plot, Kolmogorov-Smirnov), frequencies, descriptive statistics, contingency tables, chi-square.

Graphs with Chart Builder: bar, histogram, boxplot, scatterplot, Chart Editor, chart manager, chart templates, how to copy and export a chart.

Analysis: indexes, indexes with binary variables, bivariate analysis' techniques according to variables' type, Pearson and Spearman correlations, partial correlation, autocorrelation, comparing means, ANOVA, linear regression, non-linear regression, residuals plot, logistic regression.

Non-parametric tests: Mann-Whitney U, Wilcoxon, Kruskal-Wallis.

Basic programming with Visual Basic for Applications

What is an algorithm, input and output, VBA's editor and compiler inside Excel.

Subroutine, function, variable types (boolean, integer, long, real, double, character, string, variant), variable declaration, standard debug output, mathematical operations, mathematical functions, using Excel's functions inside VBA, strings' concatenation, strings' functions, comments, boolean expressions, boolean operations, IF-THEN-ELSE construct.

Date and time representation and handling, date and time functions, arrays declaration, array access, array sequential access with FOR-TO-STEP-NEXT, array as function parameters, arrays of Variant.

Interacting with Excel: taking data from Excel cells, taking data from Excel ranges, using VBA functions inside Excel.

Instructions: SUB, FUNCTION, DIM-AS, SET, IF-THEN-ELSE, OR, AND, NOT, FOR-TO-STEP-NEXT, DO WHILE-LOOP, SELECT CASE

Functions: sqr, log, exp, fix, abs, max, min, len, mid, left, right, Ucase, Lcase, inStr, InputBox, MsgBox, Now, Date, DateAdd, DateDiff, Day, Month, Year, DateSerial, UBound, LBound, Val, DateValue.

Objects and object functions: Range, WorkSheet.Range, Range.count, Range.Cells.