

Databases & Business Intelligence (Week 8-10)

Databases

The Database Evolution

The database & business data storage has had a simple, two-stage development.

Old business data storage/architecture	New business data architecture
<p>'Old' Business Data Architecture</p> <p>Functional Area #1 (Accounts) ↔ Accounts File</p> <p>Functional Area #2 (Sales) ↔ Sales File</p>	<p>'New' Business Data Architecture</p> <p>Functional Area #1 (Accounts) ↔ Enterprise Database</p> <p>Functional Area #2 (Sales) ↔ Enterprise Database</p>
<ul style="list-style-type: none"> Business has consistently organized along functional/program lines. Each program area is supported by its own software system. 	<ul style="list-style-type: none"> This architecture provides consistency & accuracy by having all program areas store data in a single, consolidated database – eliminates redundancy & inaccuracy. This solution provides integration & ∴ enables a single view of business. 🍏 This raises the quality of management analysis & decision making.
<ul style="list-style-type: none"> Whilst this system worked well in support of the specific program area, it poses many disadvantages: <ul style="list-style-type: none"> 🍌 High level of redundancy - i.e. the same information stored in multiple locations. 🍌 Inaccuracy – redundancy makes it difficult to keep info consistent & accurate <ul style="list-style-type: none"> = Data records quickly become fragmented & out of date. This produces errors & increases costs. 🍌 Non-integration & a lack of a 'business wide' view - it doesn't easily facilitate the integration of the different systems. i.e., there is little or no interconnectivity. <ul style="list-style-type: none"> = The business should be a single entity, but it is hard to get a single view of the operations of the business. This is a strategic disadvantage for businesses. 	

The Database






<p>Browser ↔ Corporate Web Server (Your query / Your response)</p> <p>Corporate Web Server ↔ Corporate Database Management System</p> <p>Corporate Database Management System contains Corporate Data</p>	<ul style="list-style-type: none"> The logical software architecture for most online businesses (pic) Web browser interacts with corporate web server.
<ul style="list-style-type: none"> Online businesses now combine the web server with a database. The database is the mission-critical component at the business end. <ul style="list-style-type: none"> 🍌 The database is the 'brains' of the process. 🍌 It is the most valuable component to the business. 	
<ul style="list-style-type: none"> All databases comprise 2 equally important components: the DBMS & the data. <ul style="list-style-type: none"> 🍌 The database management system (DBMS) is all software. 🍌 The DBMS exclusively manages the data. All access to the data must come through the DBMS. This offers advantages (problems are minimised): <ul style="list-style-type: none"> 🍌 Data redundancy (i.e. data stored in multiple places) is reduced massively. 🍌 Data isolation (i.e. data that cannot be accessed by certain relevant software applications) is eliminated. 🍌 Data inconsistency & inaccuracy (the result of data redundancy) is reduced substantially. 	
<ul style="list-style-type: none"> The DBMS & data provide fundamental improvements in overall data quality: <ul style="list-style-type: none"> 🍌 Security of data is increased with the application of a single, corporate-wide information security program. 🍌 Data integrity (data correctness) is ∴ increased. 🍌 Data independence (i.e. the creation of data in a form that's independent of any single software application) is created. 	

Information System (Week 11-12)
















Transaction Processing System (TPS)

 To understand transaction processing systems, we must firstly understand the concept of a transaction in business.



Business Transaction (4 characteristics)

-  A transaction = is a business event, for example, a sale, salary payment, or an order.
-  A business transaction may be simple – comprising only one indivisible task or activity.
 -  Often, transaction is comprised of several 'sub-tasks' or 'sub-activities'.
-  For a business transaction to complete, all 'sub-parts' must be completed successfully.
-  It's vital that all transactions are efficiently processed & accurately recorded






TPS display 6 identifying characteristics

-  TPS **monitors, collects, processes & stores** all **data** generated **from** business **transactions**.
 -  A TPS is a 'whole-of-business' system – it fundamentally supports the core business of an organization.
-  TPS is '**mission critical**' to an organization, meaning it's essential to the organization.
-  TPS **processes** extremely **high numbers of** core-business **transactions** every working day.
-  A TPS must **operate 24/7** with no 'unplanned' downtime or outages
 -  The industry benchmark for this **high-availability** is frequently described as "the TPS being fully operational at least 99.999% of the time."
-  TPS is characterized by **simple operational logic**.
 -  This means we can describe the transactions performed by a TPS in very simple terms.
 -  Consider the simplicity of an ATM:
 -  *First, the identity is confirmed via a PIN number.*
 -  *Then a choice – withdrawal of cash or an account balance.*
 -  *Then the amount of the withdrawal.*
 -  *Finally, push the cash to the ATM user.*
 -  *This is all very simple & follows a logical sequence of events.*
-  TPS **provides inputs to other information systems (IS) via a 'common' database**

TPS 'Placement'





-  The TPS is supported by a centralized database, which in turn supports a BI OLAP database & also other information systems.
-  *When someone purchases an item, the transaction is captured in 'real-time' by the scanning process, which sends the relevant data directly to the TPS.*

TPS offers 2 processing options:

Batch processing (transactions stored for later input to the TPS)	 In Batch processing, all transactions are saved & stored up in bundles or batches  These batches are then input to the TPS towards the end of the daily processing session.  Batch processing is no longer frequently used, though it was the original method used for all TPS transactions.
Online transaction processing (OLTP) - aka 'real-time' processing (transactions input into the TPS & process in real-time)	 In OLTP, each transaction is input to the TPS as soon as it has been captured, <i>in this case, by the scanner.</i>  The TPS processes the transaction & then stores the results in the appropriate database.

Enterprise Resource Planning Systems (ERP)

ERP - Naming

-  "Enterprise" refers to a large business in its totality.
 -  We are not talking about the sales group, or the HRM group; we are talking about the total business.
-  'Resource' means all fundamental resource categories of a business.
 -  These include staff, sales, purchases, customers, suppliers & all financial accounts.

Some Excel (Mainly Solver & some wk 8-10 notes)

🍌 Syntax - how to write the function (how the function is called)

🍌 Semantics - what it does (the full meaning of the call), meaning of the function

Others

Syntax & Name	Example	Semantics (what it does) & Descriptions
TRIM =trim(text)	🍌 =trim(A3)	<ul style="list-style-type: none"> ✿ Eliminates trailing spaces, leading spaces ✿ Reduces multiple spaces btw words to one
=today()	<ul style="list-style-type: none"> ✿ Returns the current date formatted as today ✿ It shows up as a completely different number when the number format is "number" → the number shown is the number of days since 1/1/1900 	
Concatenate =Concatenate(text1,text2,...) The function can be replace with "&" in between texts	<ul style="list-style-type: none"> 🍌 If C7 is 45678912 ="S"&REPLACE(C7,6,3,"**") = S45678*** 🍌 =concatenate ("the date is:", text(today()), "dd/mm/yy") 	<ul style="list-style-type: none"> ✿ Ellipsis (...) = ✿ Concatenate "joins several text strings into one text string" ✿ 1-255 text strings to be joined into a single text string & (the arguments) can be text, strings, numbers, or single cell references 🍌 <u>Text string</u> - is a excel data type 🍌 Excel is saying that all input to concatenate is treated as <u>text string</u> & the output from concatenate is also <u>text string</u> 🍌 Text string is a data type in excel ✿ Concatenate treats everything as texts ✿ Concatenate treats the 'serial number' (returned by today()) as <u>text string</u>, and hence it prints out the actual number of days
=text(value, format_text)	<ul style="list-style-type: none"> ✿ Text function converts a value to text in a specific number format ✿ The function TEXT requires a 2nd argument that tells how to format the converted arguments - e.g. d/m/yyyy 	
=right(text, num_chars) =left(text, num_chars)	<ul style="list-style-type: none"> 🍌 =left("Hello", 2) = He 	<ul style="list-style-type: none"> ✿ LEFT/RIGHT extracts an arbitrary number of individual characters from the left/right of a text string
=Replace(old_text, start_num, num_chars, new_text)	<ul style="list-style-type: none"> 🍌 =replace("candy", 4, 2, "make") =canmake 	<ul style="list-style-type: none"> ✿ Replaces part of a text string with a different text string
=Iferror(value, value_if_error)	?	<ul style="list-style-type: none"> ✿ Returns <u>value_if_error</u> if expression is an error & the value of the expression itself otherwise
=len(text)	<ul style="list-style-type: none"> 🍌 =len(hello) =5 🍌 =len(12345) =5 	<ul style="list-style-type: none"> ✿ Returns the number of characters in a text string
PMT function =PMT(rate, nper, pv, [fv], [type])	<ul style="list-style-type: none"> ✿ Calculates the payment for a loan based on constant payments & a constant interest rate ✿ Requires 3 arguments: <ul style="list-style-type: none"> 1. Rate <ul style="list-style-type: none"> 🍌 When you use this function, nearly always, you will be dividing this by 12 🍌 However, if this is a quarterly payment, we'd divide by 4. If you only pay once a year, then divide by 1. 2. Nper - the number of periods in the payback period 3. Pv - the amount we're borrowing 4. [fv] 5. [type] 	