

Turning Perfectly Good Words into Numbers

***Quick and Early Function Points
And Project Estimation***

2010

Why Sizing is Important

- Requirements - Expectation management
- Estimation - Effective management practice, resource management
- Process Improvement - Process management
- Change Control – Project Management



Characteristics of an Effective Sizing Metric

- Meaningful to both developer and business user
- Defined (industry recognized)
- Consistent (methodology)
- Easy to learn and apply
- Accurate, statistically based
- Available when needed (early)



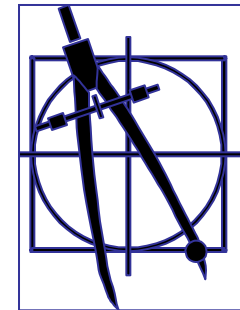
Goal of QEFP

- Extensible process (can grow)
- CMMI® compliant
- Creates data useful later in project

Why Function Point Analysis?

Function Point Analysis is a **standardized** method for **measuring** the **functionality delivered** to a user.

- Consistent method
- Easy to learn
- Available early in the lifecycle
- Acceptable level of accuracy
- Meaningful internally and externally



Function Point counts have replaced Line of Code counts as a sizing metric that can be used consistently and with a high degree of accuracy.

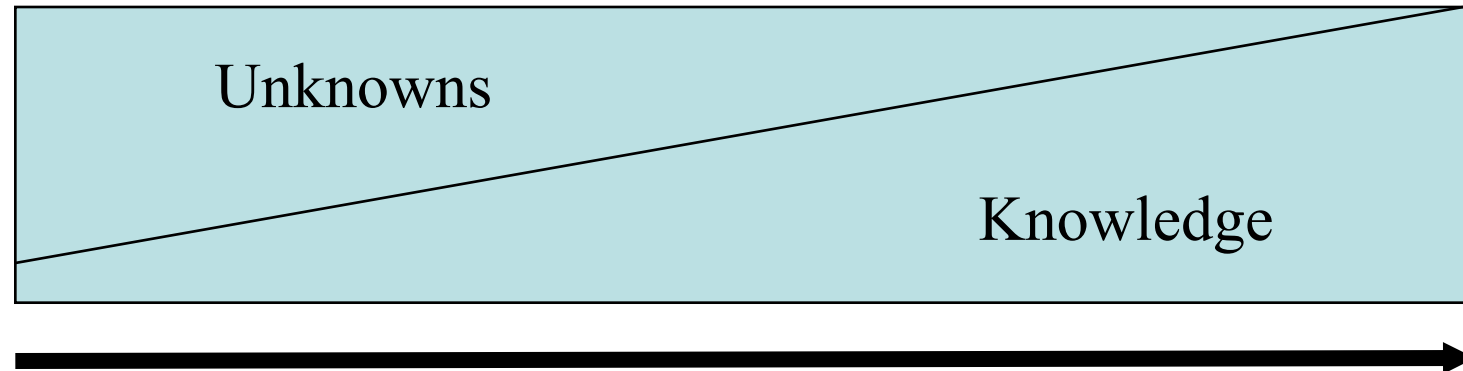
Common Criticisms of Function Points

This Method Addresses

- FP methodology terms are confusing
- Too long to learn, need an expert
- Need too much detailed data
- Does not reflect the complexity of the application
- “I did more work than I am getting credit for”
- Does not fit with new technologies
- Takes too much time
- We tried it before

The Environment for Quick and Early Function Points (QEFP)

- You start projects knowing very little (as compared to when a project is implemented)



Budgeting Initiation

Implementation

- Words are the only thing typically known before a project is initiated (usually not very many)

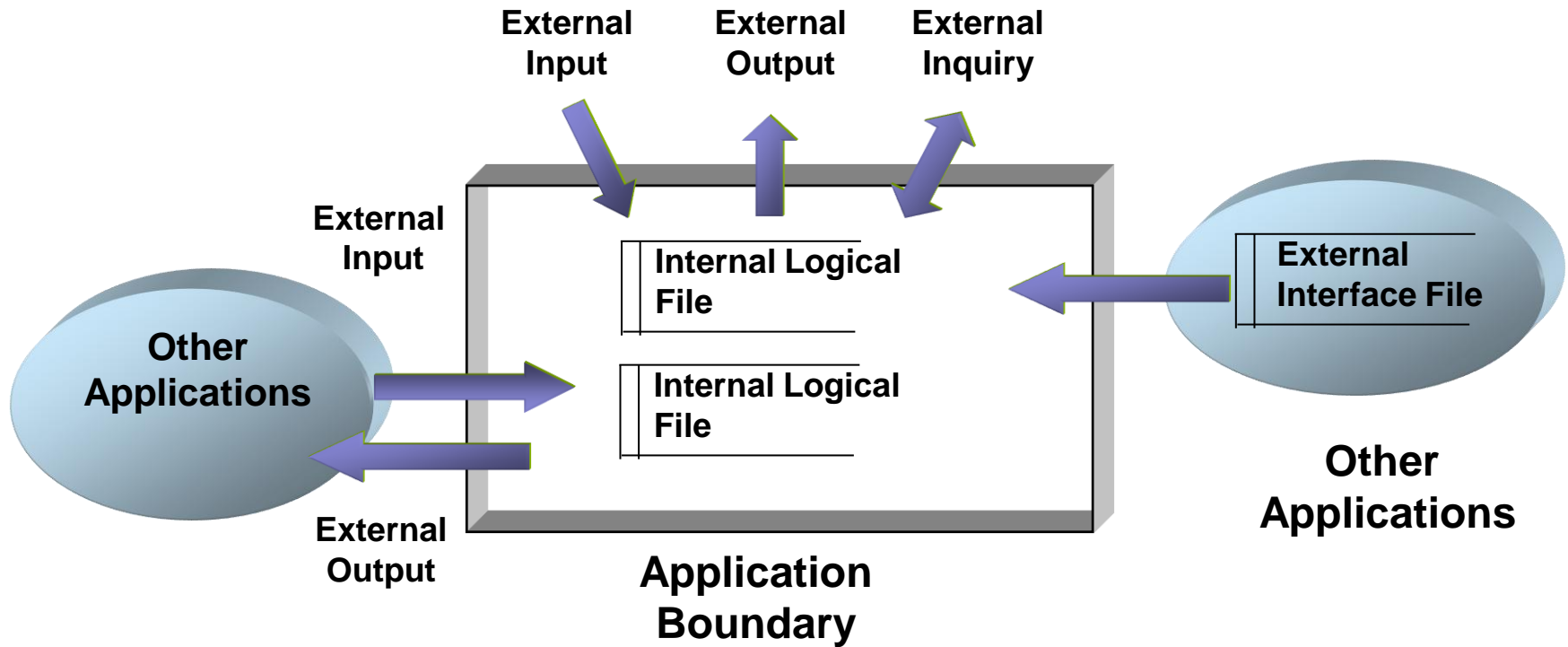


Why Size, Scope and Other Topics

- Why size
 - Size provides a currency to discuss projects
 - Quantify scope creep
 - Maintain baseline and measure impact of change
- What we will size?
 - Projects will size all functionality developed, enhanced, deleted or delivered
 - Delivered may include functionality bought, borrowed, reused or developed



The Logical View



The Standard Counting Process

- Determine the type of Function Point count
- Identify the counting scope and application boundary
- Count the data functions to determine their contribution to the unadjusted function point count
- Count the transactional functions to determine their contribution to the unadjusted function point count
- Determine the value adjustment factor - 14 General System Characteristics
- Calculate adjusted function point count



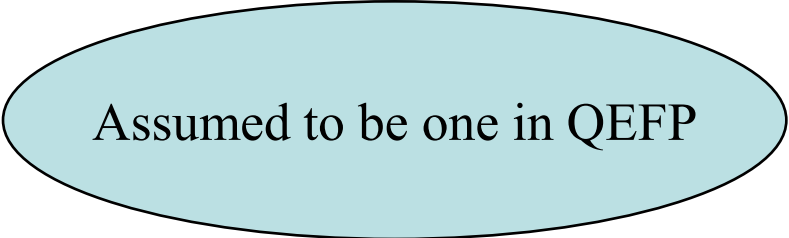
Simplifying the Methodology

- Turning words into numbers quickly and efficiently requires some simplification of how to think about the counting methodology.
- **HOWEVER**, all counting starts with the Identification Rules
 - Contained in the IFPUG Counting Practices Manual (CPM), Version 4.2, dated January 2004.
 - Quick and Early Function Points is not carte blanche to count technical or non-functional requirements.



FP Evaluates These Components

- Data Functions
 - Internal Groupings of data called Internal Logical Files (ILF)
 - External Groupings of data or External Interface Files (EIF)
 - The term file does not refer to files in the physical sense, rather refers to logical data stores, entities, objects or super-classes
- Transaction Functions
 - External Inputs (EI)
 - External Outputs (EO)
 - External Inquires (EQ)
- General System Characteristics
- We will explore the definitions of each of these components in the next section



Assumed to be one in QEFP

Count FP Components

- FP Counting is based on Identification Rules and Complexity Rules
 - Contained in the IFPUG Counting Practices Manual (CPM), Version 4.2, dated January 2004, which is the basis for this Course.
- International Function Point Users Group (IFPUG)
 - Maintains Public Standard for Sizing Software (CPM)



Component Complexity

❑ COMPONENTS ARE RATED BASED UPON COMPLEXITY:

❑ (or fields)
with
or

We are going to make the assumption that all items are average!
Don't worry about counting DETs, RETs and FTRs

total

Ex
External

X 7
X 6



Simplify the Methodology

- View Complexity as Average

Low	Low	Average
Low	Average	High
Average	High	High

- Leads to approximation

Components:	Low	Avg.	High	Total
Data Stores	__ x 7	__ x 10	__ x 15	___
Interfaces	__ x 5	__ x 7	__ x 10	___
Inputs	__ x 3	__ x 4	__ x 6	___
Outputs	__ x 4	__ x 5	__ x 7	___
Inquiries	__ x 3	__ x 4	__ x 6	___
Total Unadjusted FPs				___

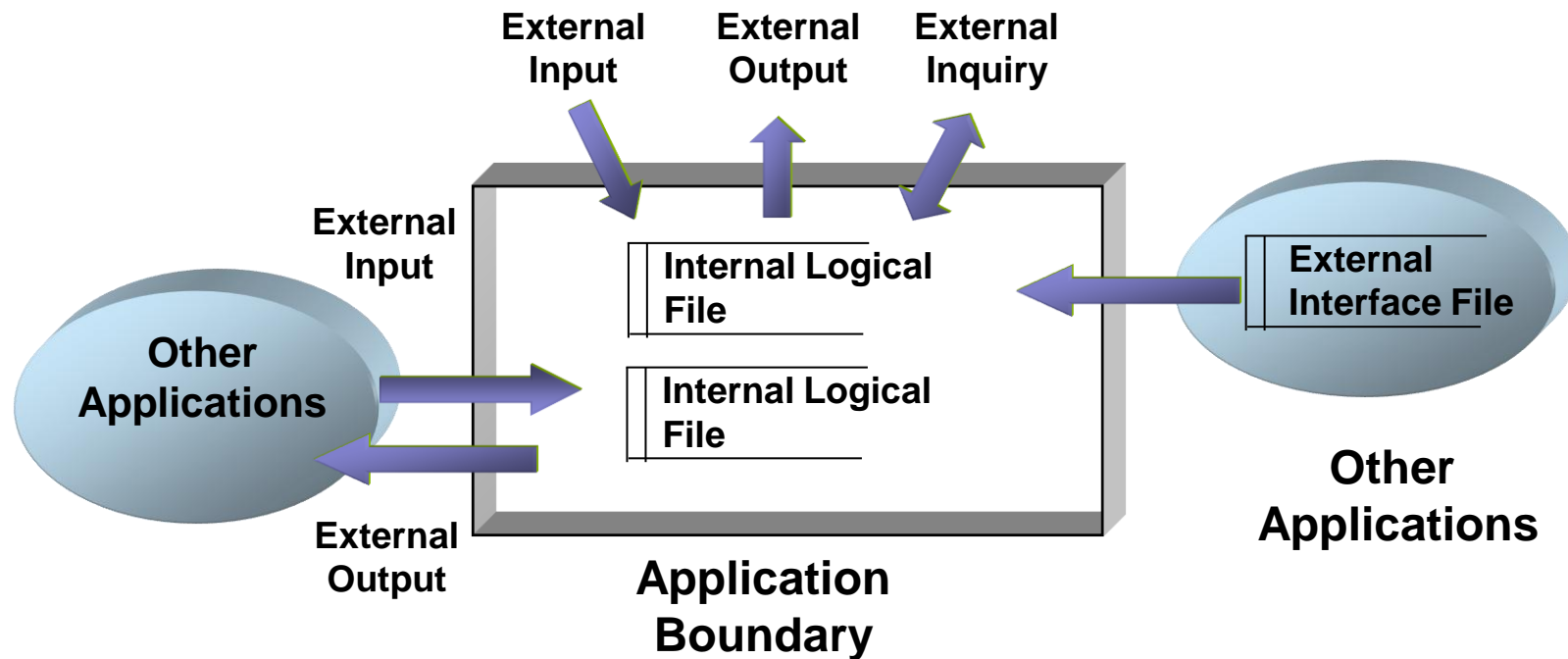


Quick and Early Function Point Process

1. Determine the type of Function Point count
2. Identify the counting scope and application boundary
3. Identify and count the data functions to determine their contribution to the unadjusted function point count
4. Identify and count the transactional functions to determine their contribution to the unadjusted function point count



Diagramming an Application Boundary

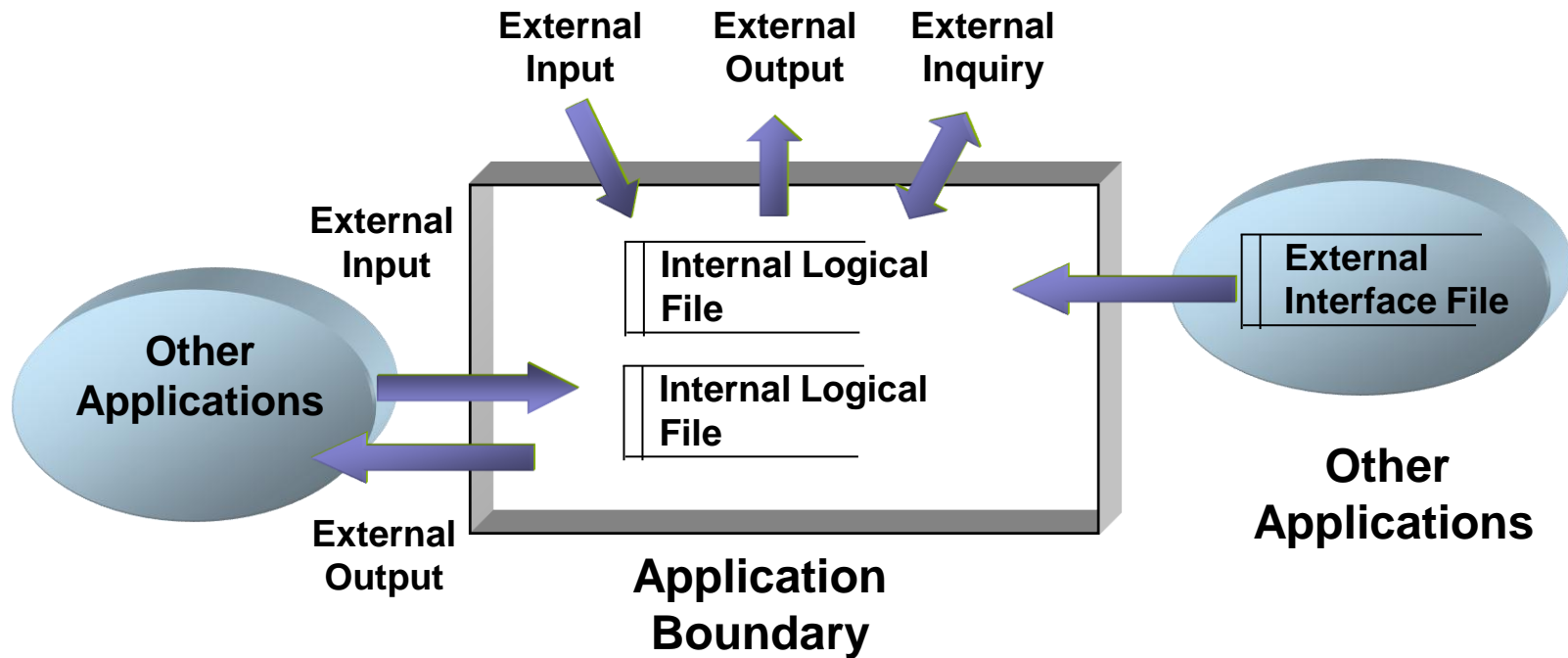


Counting Scope Examples



- Scope of enhancement count
 - includes all functions being added, changed and deleted
 - boundary of impacted application(s) remains the same
 - functionality of the application reflects the impact of the functions added, changed or deleted
- Scope of a development count
 - includes all functions impacted (built or customized) by the project activities
- Scope of an application count may include
 - only the functions being used by the user (if purpose is to provide package as software solution), or
 - all the functions delivered

Quick And Early Function Points: The Primer



Quick and Early Function Point Process

1. Count all projects as an Enhancement Project.
2. Identify the counting scope and application boundary (Refer to the CPM for the rules and suggestions).
3. Segregate functional, nonfunctional and technical requirements:
 - Identify and count the data functions to determine their contribution to the unadjusted function point count.
 - Identify and count the transactional functions to determine their contribution to the unadjusted function point count.
4. Calculate the function point count.

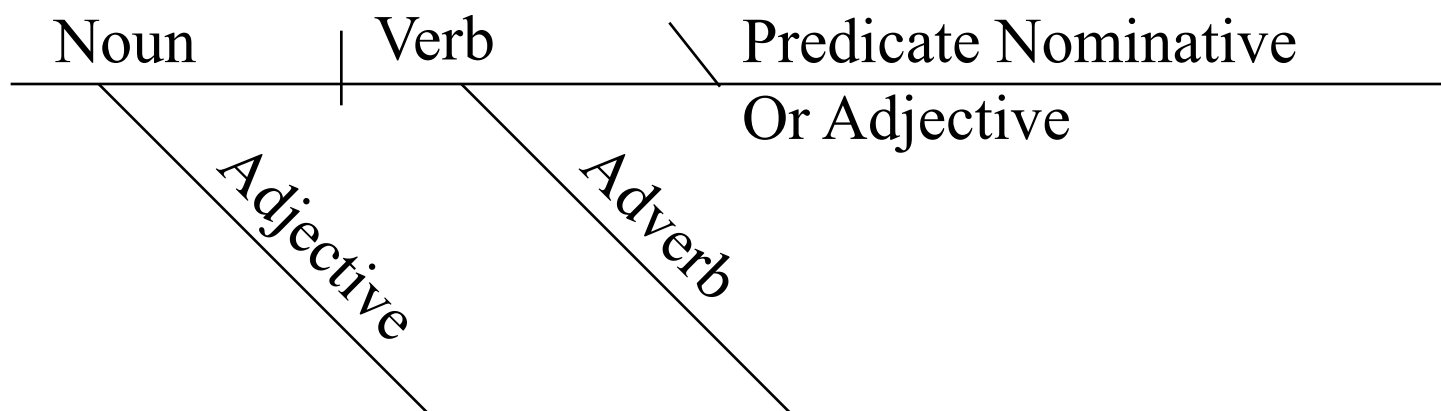
Getting Ready for 'Fun With Words'

- Segregate functional from functional and non-functional requirements.
 - Nonfunctional are requirements that specify criteria that can be used to describe the operation of a system rather than specific behaviors – adjectives describing overall characteristics.
 - Functional requirements that specify specific behavior or functions (mostly about process) – nouns (data) and verbs (transactions).
- While you are at it expunge the technical requirements.
 - Technical requirements are the hardware and software integration issues such as security, compatibility with existing systems, performance requirements, and so on.



Revisiting Grade School English

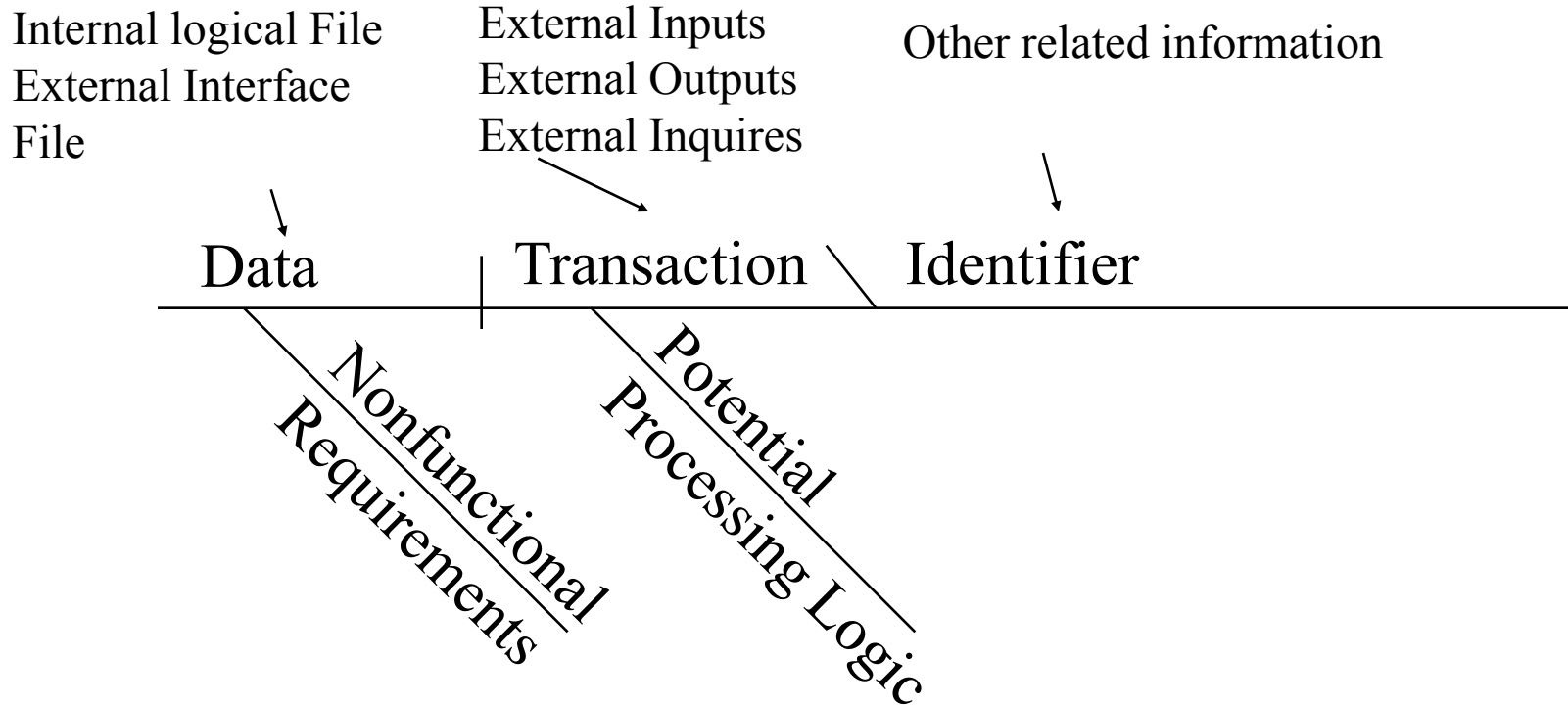
- Sentence Diagramming



In case you forgot - a predicate is an expression that can be true of something (the car is yellow)

Translation

Function Point Diagramming



The goal is not diagram the whole requirement sentence but rather to use the logic of the diagramming process to get to the measureable component.



A Real Example

- An example

16) E-mail reminder sent out the day before to remind visitor of favorite events

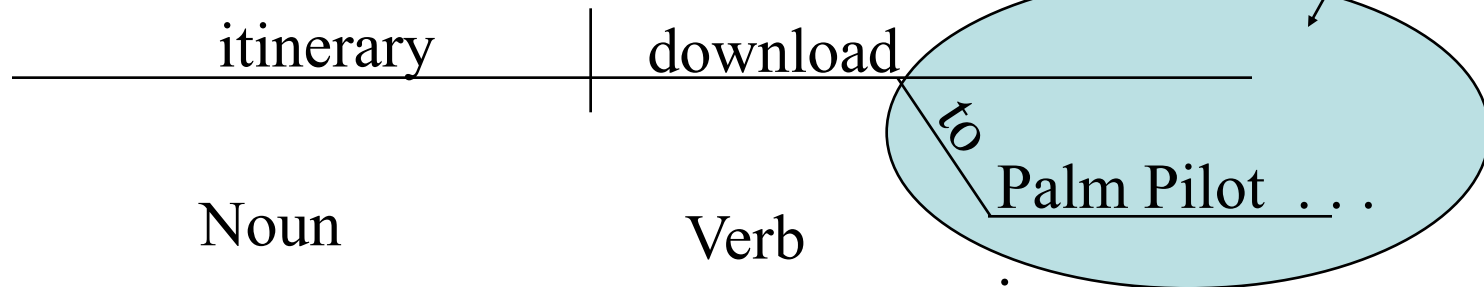
★ 17) Ability to download an itinerary to my Palm Pilot, iCal, Outlook or other calendar

18) Ability to forward and share an itinerary or Event with another person by sending it to their e-mail address

Can you find the word the client spelled wrong?

Relevant?

What would make it?



Translation Tool: Trigger Words

Nouns



Data
Functions

Internal
Logical Files

External
Interface Files

Verbs



Transactions
Functions

External Inputs

External Outputs

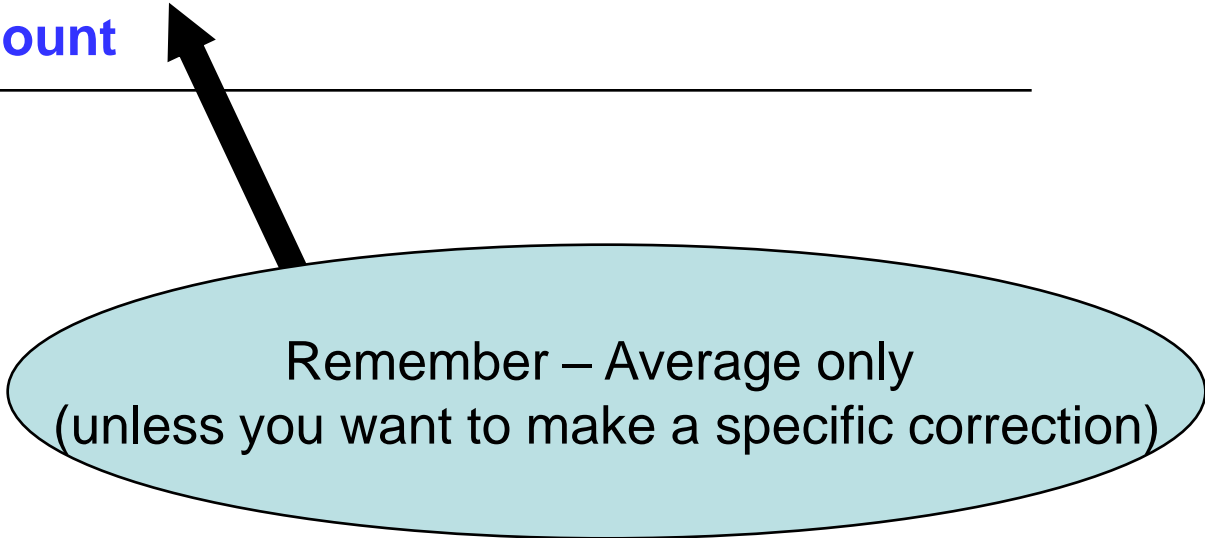
External Inquires



Function Points

Data Counting Procedures

Step	Action
1	Identify the ILFs and EIFs
2	Determine the ILF or EIF complexity and their contribution to the unadjusted function point count




Remember – Average only
(unless you want to make a specific correction)

Data Functions

- Data functions represent the functionality provided to the user to meet internal and external data requirements
 - Internal Logical Files (ILFs)
 - External Interface Files (EIFs)
- The term *file* here does not mean file in the traditional data processing sense; in this case, file refers to a logically related group of data and not the physical implementation of those groups of data

Data

- Nouns describe data.

Update  name and address

Suggests an . . .

- Apply standard ILF / EIF rules from the CPM after you identify a potential ILF or EIF.



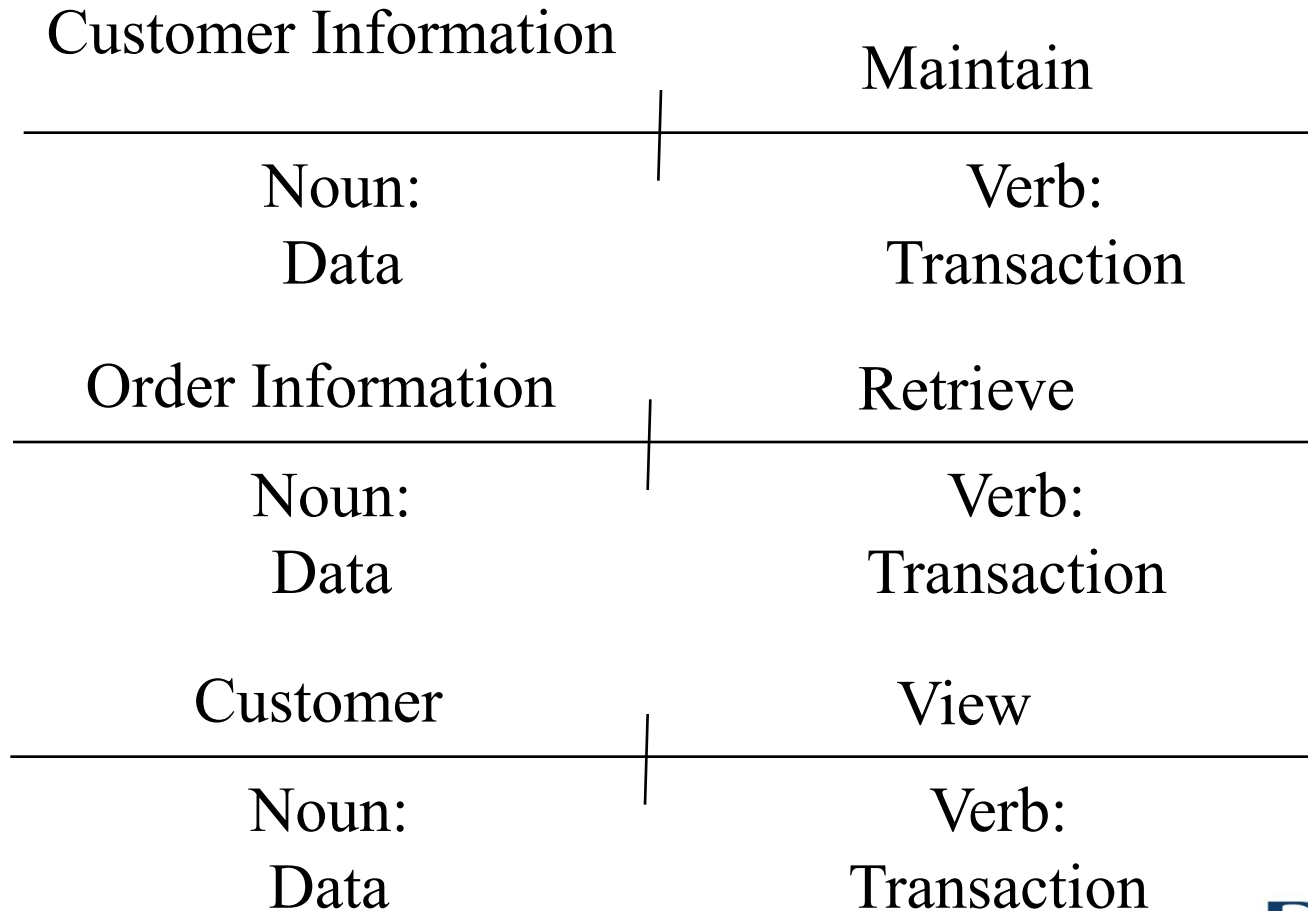
Internal Logical Files - Exercise

- User requirements:
 - Maintain **CUSTOMER** information.
 - Marketing department needs to retrieve all past **ORDER** information, even if a **CUSTOMER** is deleted in order to develop marketing strategies for the following year.
 - View **CUSTOMER** in sorted order.

Nouns that suggest ILFs



Simple Diagrams



Not Unique
Count Only
Once



Transaction Function Process

Step	Action
1	Identify the elementary processes
2	Determine the primary intent of the identified elementary processes, and classify as an EI, EO or EQ
3	Validate against the transaction (EI, EO, EQ) identification rules
4	Determine the transaction (EI, EO, EQ) complexity
5	Determine the transaction (EI, EO, EQ) contribution to the unadjusted function point count

Remember
– Average



Definition of New Term

- **Processing Logic**

- Requirements to complete an elementary process (not to determine separate External Inputs, External Outputs or External Inquires); an elementary process may include the following actions:
 - Validations are performed
 - Mathematical formulae or calculations are performed
 - Equivalent values are retrieved
 - Data is filtered and selected using specified criteria to compare multiple sets of data
 - Conditions are analyzed to determine which are applicable
 - One or more ILFs are updated
 - One or more ILFs or EIFs are referenced
 - Data or control information is retrieved
 - Derived data is created
 - Behavior of the system is altered
 - Information is prepared and presented outside the boundary
 - Data or control information that enters the application boundary is accepted
 - Data is resorted or rearranged



External Inputs

- An external input (EI) is an elementary process that processes data or control information that comes from outside the application's boundary
- The **primary intent** of an EI is to maintain one or more ILFs and/or to alter the behavior of the system

Transactions

- Verbs describe transactions (process).

Suggests an EI

 Update name and address

- Apply standard EI, EO or EQ rules from the CPM.
- Mercilessly apply uniqueness rules.



Words That Suggest EIs!

Add

Allocate

Assign

Associate

Change

Create

Delete

Import

Modify

Pull

Record

Remove

Reset

Reverse

Set

Undo

Update

Upload

Activate

Inactivate



External Outputs

- An external output (EO) is an elementary process that sends data or control information outside the application's boundary
- The primary intent of an external output is to present information to a user through the processing logic other than or in addition to the retrieval of data or control information
- The processing logic must contain at least one mathematical formula or calculation, create derived data, maintain one or more ILFs and/or alter the behavior of the system

Words That Suggest EOs!

Adjust

Export*

Generate

Notify

Print

Report

Summary

Save As

Calculate

Pass*

Push*

Populate / Auto-populate*

Validate

* If derived or calculated values

External Inquiries

- An external inquiry (EQ) is an elementary process that sends data or control information outside the application boundary
- The primary intent of an external inquiry is to present information to the user through the retrieval of data or control information
- The processing logic contains no mathematical formula or calculation, and creates no derived data
- No ILF is maintained during the processing, nor is the behavior of the system altered

Words That Suggest EQs!

Browse

Display

Enquire

Extract

Inquire

List

PickList

View

Pass*

Push*

Pull*

Populate / Auto-populate*

* If not derived or not calculated values

Transaction Functions

- Transactional functions represent the functionality provided to the user for the processing of data by an application
- Transactional functions are defined by their elementary process and primary intent as follows:
- **Inputs -- External Inputs (EIs)**
 - For the **Elementary Processes** where the **Primary Intent** is to **maintain an ILF** or to alter the behavior of the system:
- **External Outputs (EOs)**
 - For the **Elementary Processes** where the **Primary Intent** is to **present information** to the user and that **perform calculations, derive data, update an ILF** or alter the behavior of the system:
- **External Inquiries (EQs)**
 - For the **Elementary Processes** where the **Primary Intent** is to **present information** to the user and that **do not perform calculations, derive data, update an ILF** or alter the behavior of the system



Summary of Functions (EI,EO,EQ)

Primary Intent	EI	EO	EQ
Alter the behavior of the system	PI	F	N/A
Maintain one or more ILFs	PI	F	N/A
Present information to the user	F	PI	PI

Legend:

PI: primary intent of the transaction function

F: function of the transaction function, but is not the primary intent and is sometimes present

N/A: the function is not allowed by the transaction function



Another Point Of View

- External Input – Modify
- External Output – Calculate
- External Inquiry - Retrieve

Summary

- Function Points Can Be Fast!
 - Data and transactions are really just nouns and verbs
 - Trigger words are the markers for counting Function Points FAST
- Quick and Early Function Points
 - Same Basic Rules
 - Data and transactions are counted as average
 - Do not rate GSCs (assume 1)

References

- For more information:
 - The David Consulting Group
 - www.davidconsultinggroup.com
 - International Software Benchmarking Standards Group
 - www.isbsg.org.au
 - International Function Point Users Group
 - www.ifpug.org
 - Software Engineering Institute, Project Sizing & Estimating
 - www.cmu.sei.edu
 - Sentence Diagrams by Eugene R. Moutoux
 - www.geocities.com/gene_moutoux/diagrams.htm

Contact Data

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“Call me, beep me if ya wanna reach me
When ya wanna page me it's okay
I just can't wait until I hear my cell phone ring
Doesn't matter if it's day or night
Everything's gonna be alright
Whenever you need me baby
Call me, beep me if ya wanna reach me”
- Kim Possible Theme Song 