MIS 5206
Protecting Information Assets
- Unit# 1b -

Data Classification Processes and Models

Agenda

- Vocabulary
- Data Classification Process and Models
- Test taking tip
- Quiz

Information Systems Security Controls

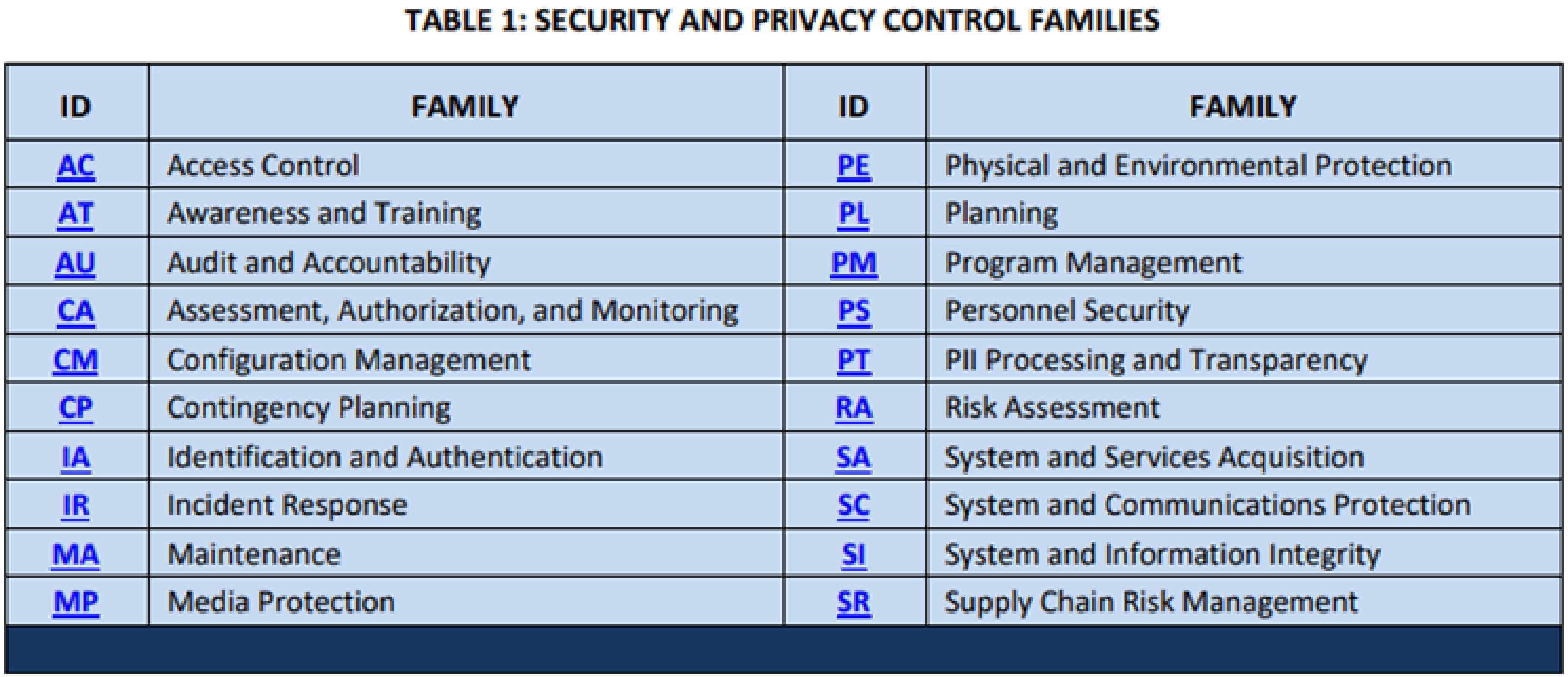


TABLE 1: SECURITY AND PRIVACY CONTROL FAMILIES

ID	FAMILY	ID	FAMILY
AC	Access Control	PE	Physical and Environmental Protection
AT	Awareness and Training	PL	Planning
AU	Audit and Accountability	PM	Program Management
CA	Assessment, Authorization, and Monitoring	PS	Personnel Security
CM	Configuration Management	PT	PII Processing and Transparency
CP	Contingency Planning	RA	Risk Assessment
IA	Identification and Authentication	SA	System and Services Acquisition
IR	Incident Response	SC	System and Communications Protection
MA	Maintenance	SI	System and Information Integrity
MP	Media Protection	SR	Supply Chain Risk Management

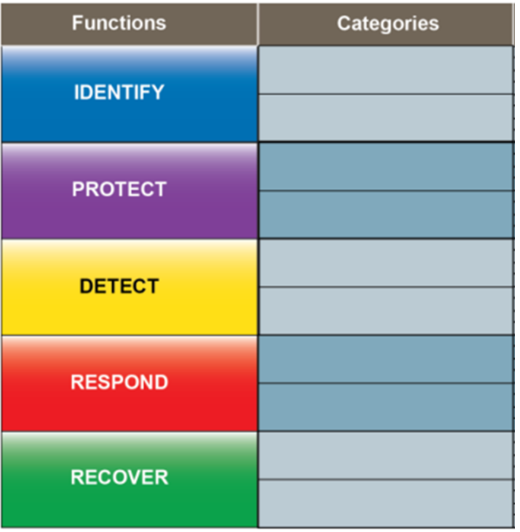
Taxonomies of “InfoSys” Controls

By Function

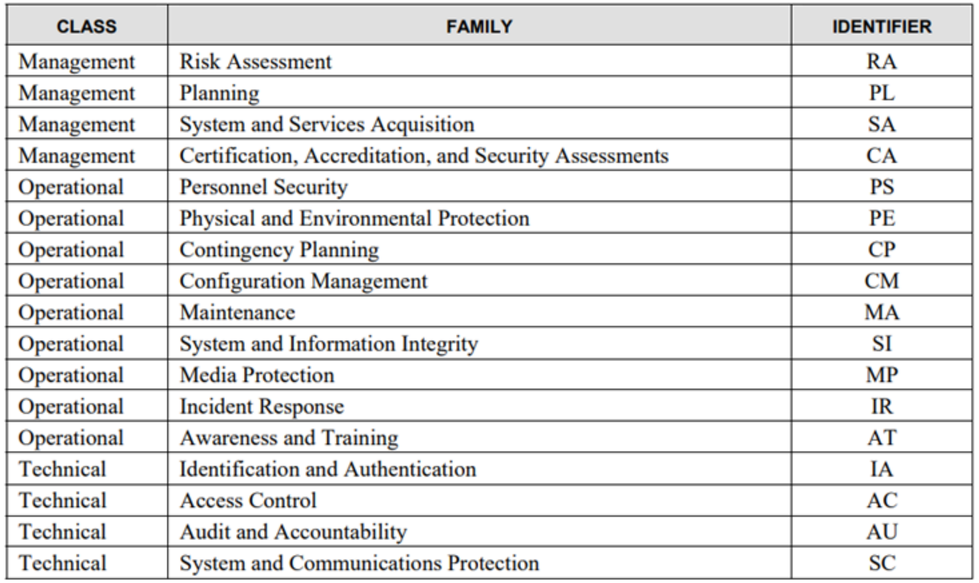
- Identify
- Protect
- Detect
- Respond
- Recover

By Class

- Management
- Operational
- Technical



Functions	Categories
IDENTIFY	
PROTECT	
DETECT	
RESPOND	
RECOVER	



CLASS	FAMILY	IDENTIFIER
Management	Risk Assessment	RA
Management	Planning	PL
Management	System and Services Acquisition	SA
Management	Certification, Accreditation, and Security Assessments	CA
Operational	Personnel Security	PS
Operational	Physical and Environmental Protection	PE
Operational	Contingency Planning	CP
Operational	Configuration Management	CM
Operational	Maintenance	MA
Operational	System and Information Integrity	SI
Operational	Media Protection	MP
Operational	Incident Response	IR
Operational	Awareness and Training	AT
Technical	Identification and Authentication	IA
Technical	Access Control	AC
Technical	Audit and Accountability	AU
Technical	System and Communications Protection	SC

Taxonomies of InfoSys Controls

By <u>Modality</u>

1. Physical
2. Technical
3. Administrative

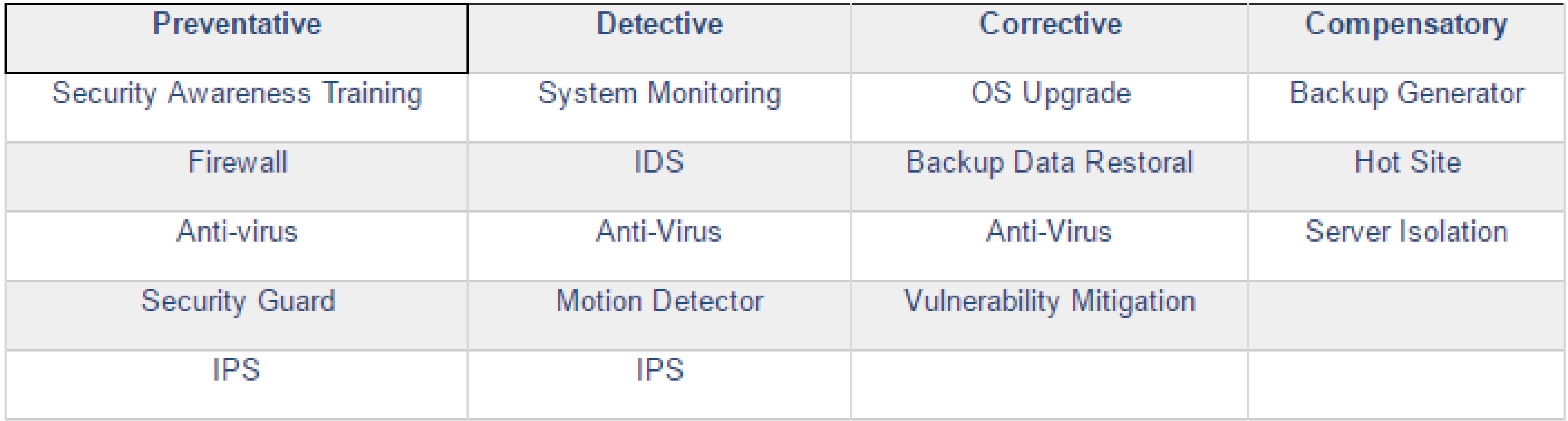
A modality is the way (or mode) in which something is done

http://www.sans.edu/research/security-laboratory/article/security-controls

Taxonomies of InfoSys Controls

By *Phase*

1. Preventative
2. Detective
3. Corrective



Preventative	Detective	Corrective	Compensatory
Security Awareness Training	System Monitoring	OS Upgrade	Backup Generator
Firewall	IDS	Backup Data Restoral	Hot Site
Anti-virus	Anti-Virus	Anti-Virus	Server Isolation
Security Guard	Motion Detector	Vulnerability Mitigation	
IPS	IPS		

These are sometimes referred to as "*phase controls*"

http://www.sans.edu/research/security-laboratory/article/security-controls

Taxonomies of InfoSys Controls

By function

- Preventive
- Detective
- Corrective
- Compensating

By modality

- Physical
- Technical
- Administrative

Juxtaposing taxonomies to improve understanding…

Modality

Function

Controls	Administrative	Technical	Physical
Preventive	*User registration*	*Passwords, Tokens*	*Fences*
Detective	*Report reviews*	*Audit Logs*	*Sensors*
Corrective	*Employee termination*	*Connection management*	*Fire extinguisher*
Compensating	*Supervision*	*Keystroke logging*	*Layered defenses*

Question

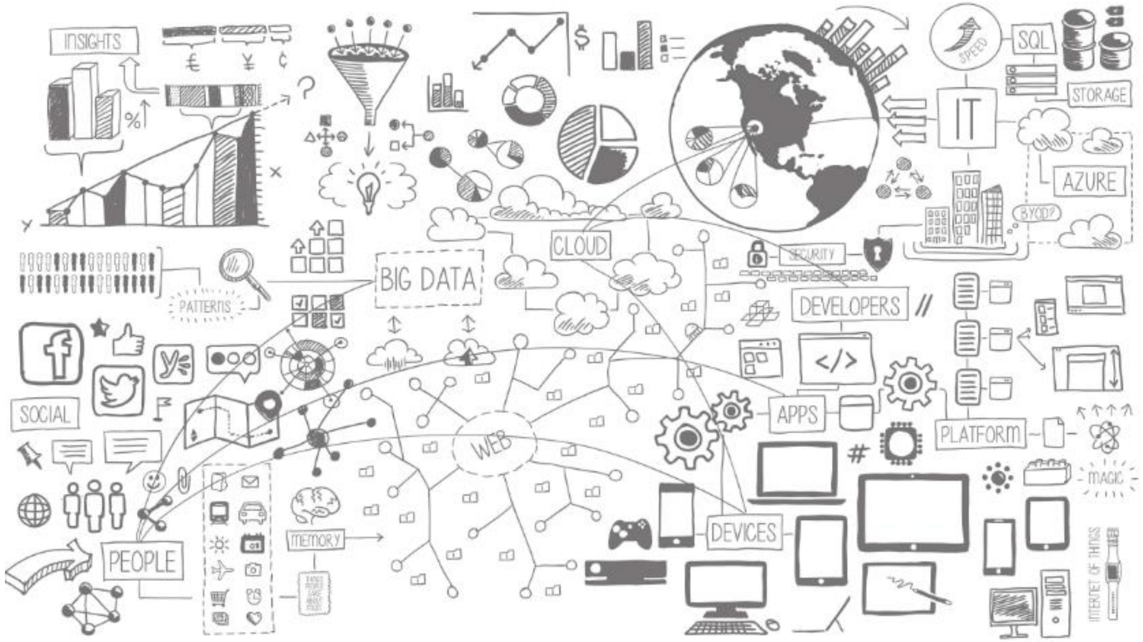
- What is data ?
- What is information ?
- How do data and information relate to each other?
- What is an information system?

What is data ?

http://researchdata.ox.ac.uk/

1. Known facts or things used as a basis for inference or reckoning
2. Quantities or characters operated on by a computer etc.

The Concise Oxford Dictionary



https://blogs.microsoft.com/blog/2014/04/15/a-data-culture-for-everyone/

What is the nature of data stored in the attributes comprising the entities within the information system's databases

What is information?

An Entity's attribute values can be understood in terms of ***"measurement levels"***

Stevens, S.S. 1946. On the theory of scales of measurement. Science 103:677-680.

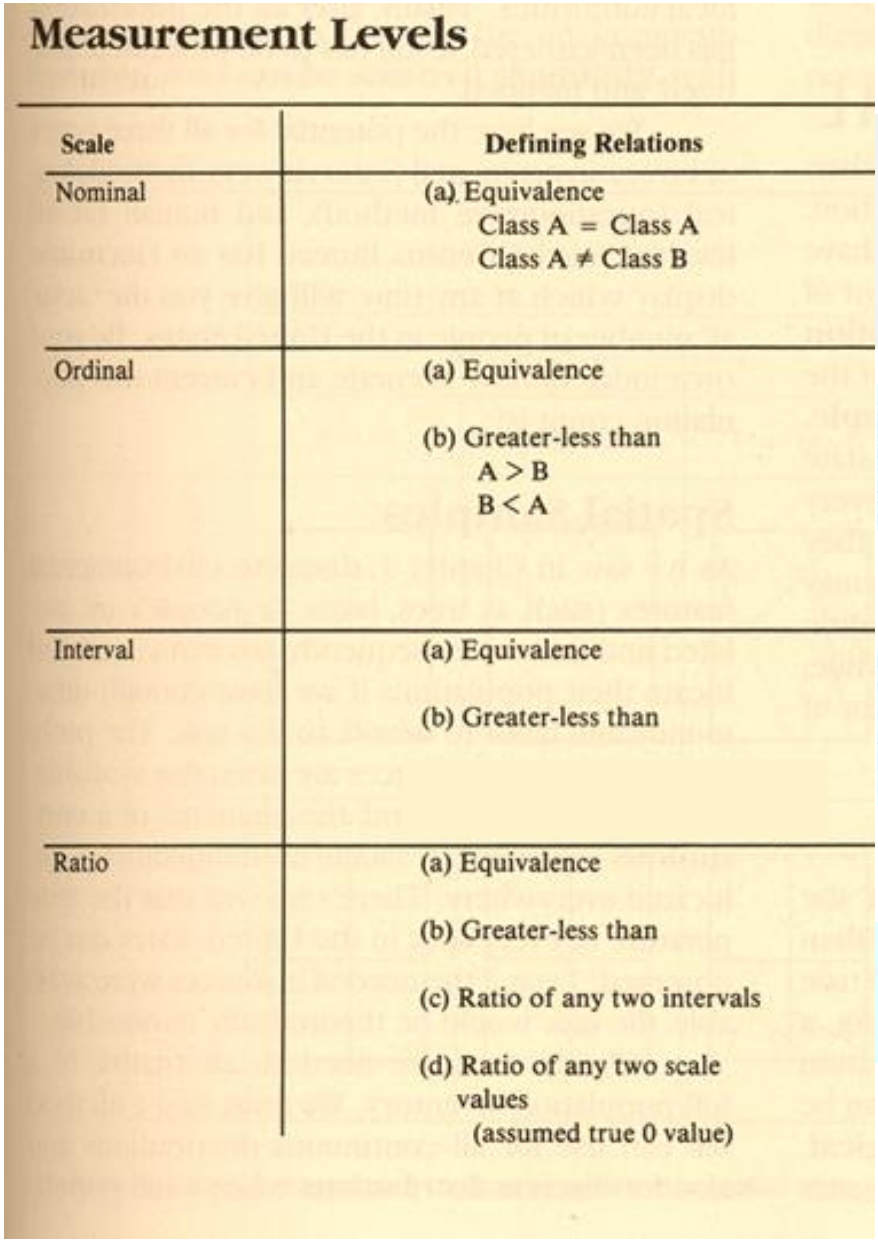
Measurements levels describe the inherent nature of information in the attribute data that make up entities

- Qualitative information tells what things exist
- Quantitative information orders and measures the magnitude of these things

Steven's 4 measurement levels

1. Nominal
2. Ordinal
3. Interval
4. Ratio

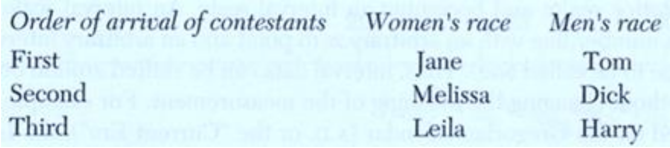
Increasing information content



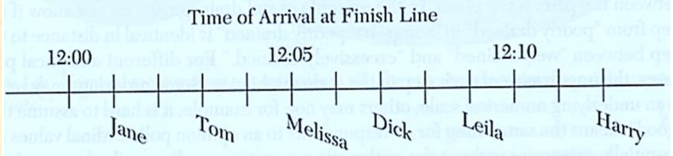
Measurement Levels

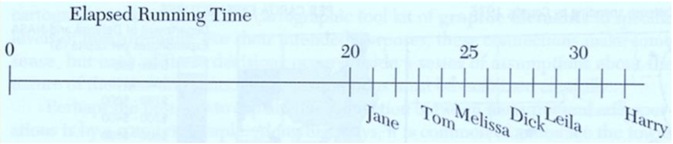
Scale	Defining Relations
Nominal	(a) Equivalence Class A = Class A Class A ≠ Class B
Ordinal	(a) Equivalence (b) Greater-less than A > B B < A
Interval	(a) Equivalence (b) Greater-less than
Ratio	(a) Equivalence (b) Greater-less than (c) Ratio of any two intervals (d) Ratio of any two scale values (assumed true 0 value)

Polka dot
Solid Color



Order of arrival of contestants	*Women's race*	*Men's race*
First	Jane	Tom
Second	Melissa	Dick
Third	Leila	Harry

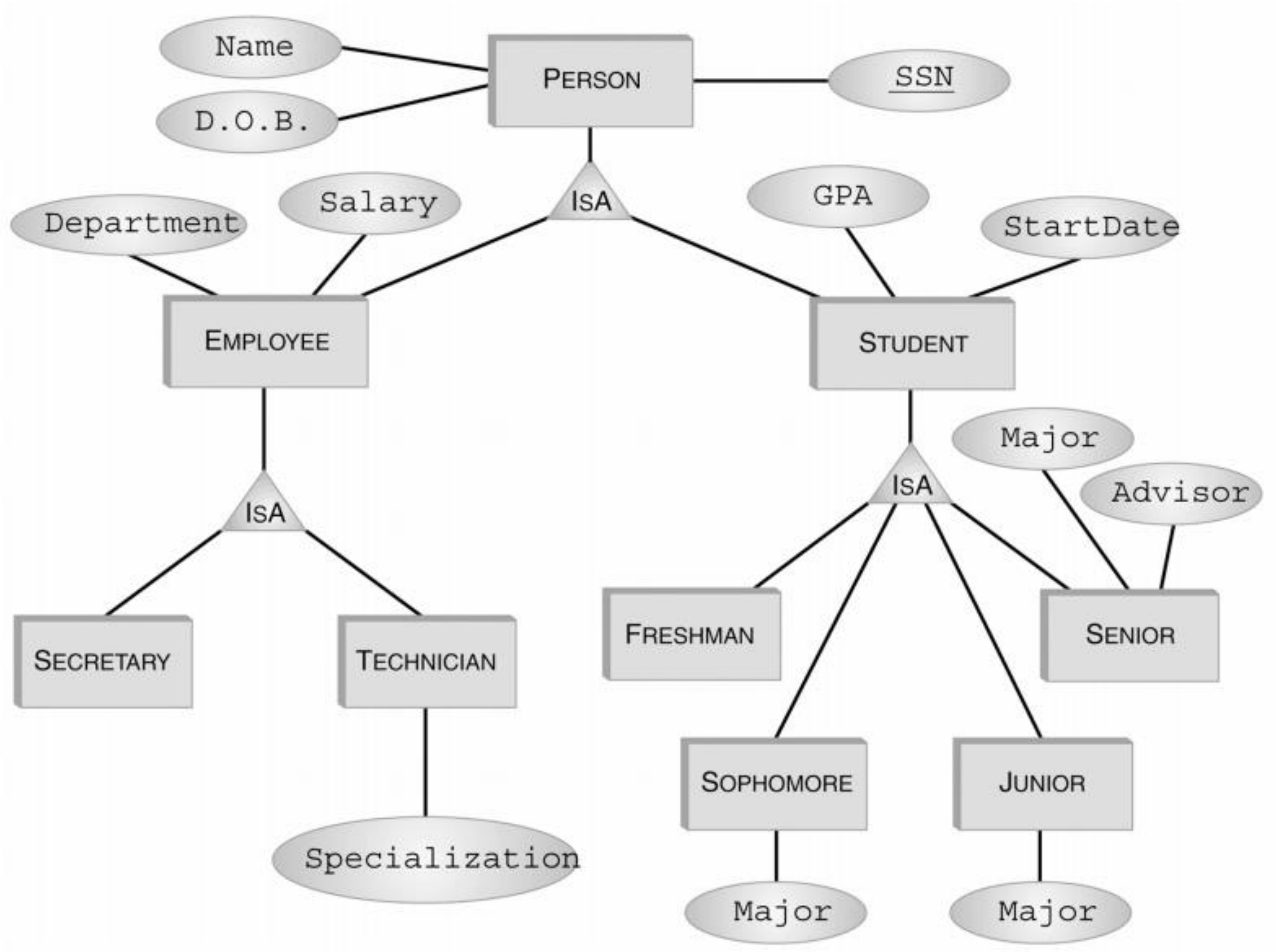




Entity Attribute Value Measurement Types

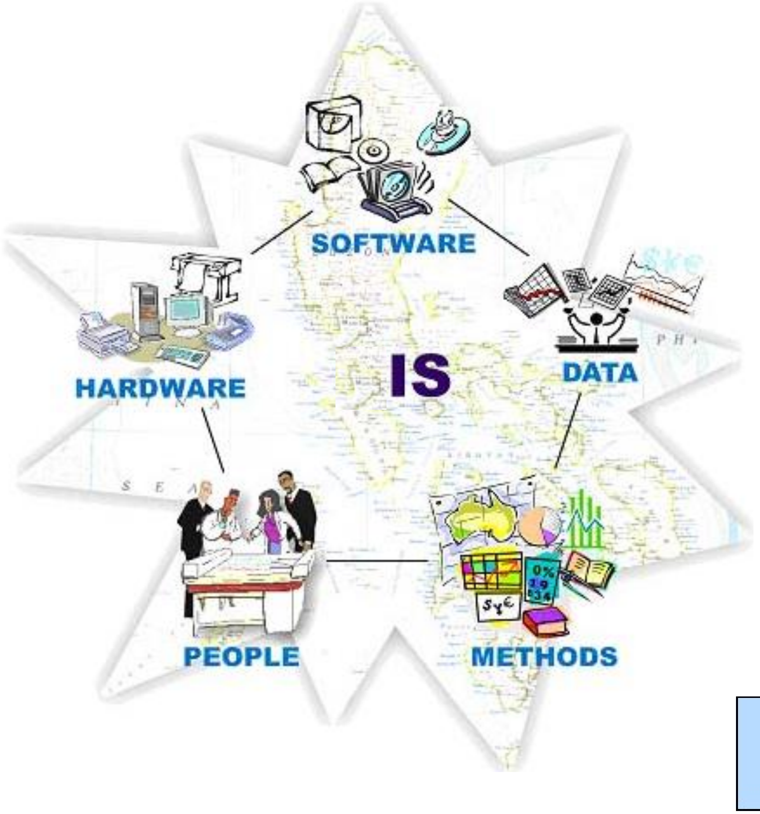
	Qualitative	**Quantitative**
Nominal	X	
Ordinal	X	
Interval		X
Ratio		X

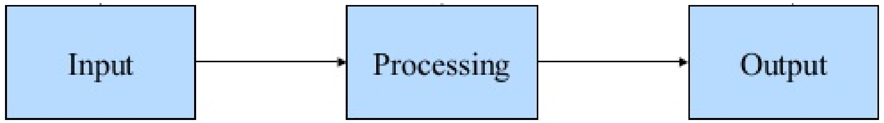
How would you use Steven’s measurements levels to categorize this information ?



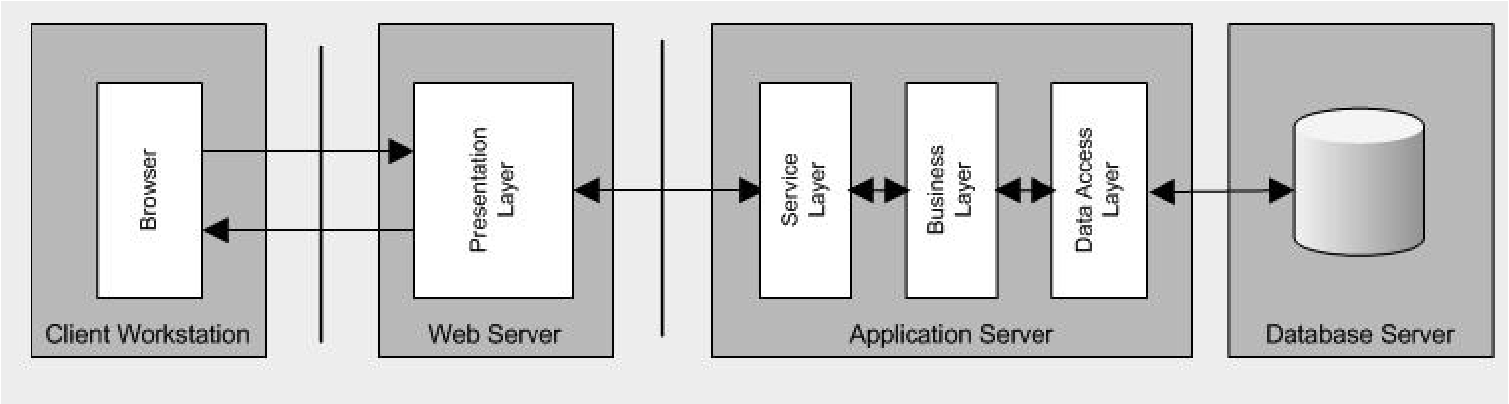
What is an information system

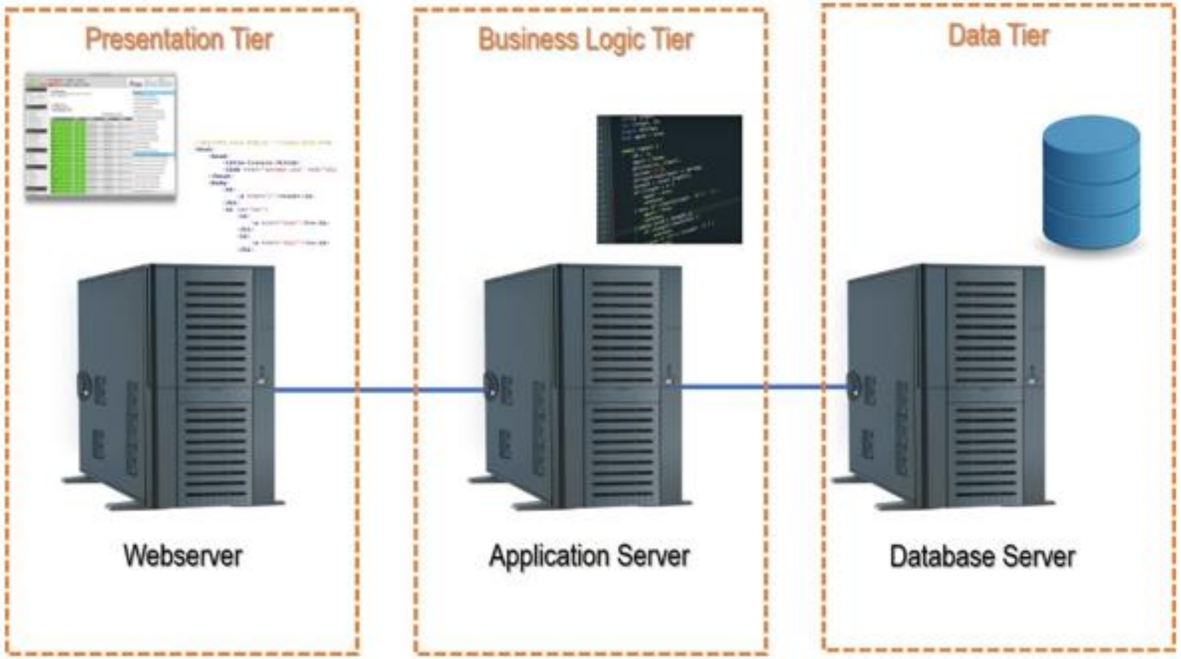
“An **information system** (**IS**) is an organized system for the collection, organization, storage and communication of information. …complementary networks that people and organizations use to collect, filter (query), process, create and distribute data. Further, an information system (IS) is a group of components that interact to produce information.” Wikepedia



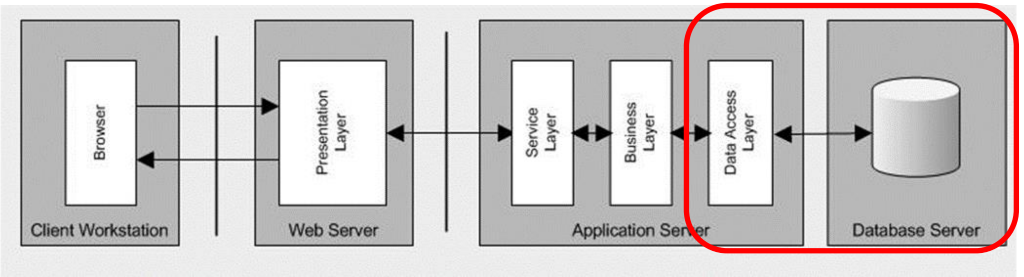


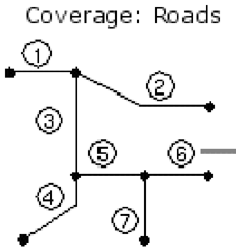
Information system (IS) architectures





Information System Data





Roads #	x,y Coordinates
1	2,12 6,12
2	6,12 10,10 14,10
3	6,6 6,12
4	3,2 6,4 6,6
5	6,6 10,6
6	10,6 14,6
7	10,2 10,6

Road Number	Road Type	Surface	Width	Lanes	Name
1	1	Concrete	60	4	Hwy 42
2	1	Concrete	60	4	Hwy 42
3	2	Asphalt	48	4	N Main St.
4	2	Asphalt	48	4	N Main St.
5	3	Asphalt	32	2	Cedar Ave.
6	3	Asphalt	32	2	Cedar Ave.
7	4	Asphalt	32	2	Elm St.

Relational Data Model

Student Relation

Sid #	Name	Year	GPA
1	Smith	3	3.0
2	Jones	2	3.5
3	Doe	1	1.2
4	Varda	4	4.0
5	Carey	4	0.5

Faculty Relation

Fid #	Name	Position	Dept
9	Henry	Prof.	Math
2	Jackson	Assist. Prof	Hist
14	Schuh	Assoc. Prof	Chem
21	Lerner	Assist. Prof	CS

Course Relation

C #	Course Name	Cr	Dept
223	Calculus	5	Math
302	Intro Prog	3	CS
302	Organic Chem	3	Chem
542	Asian Hist	2	Hist
222	Calculus	5	Math

Taught-By Relation

C #	Fid #
223	9
222	9
302	21
302	14
542	2

Enrolled Relation

Sid #	C #
1	223
4	222
4	302
3	302
5	302
2	542
2	223

Concept

Classification Grouping of data according to pre-determined types

Why classify data ?

Data Classification Processes and Models

Data classification ("categorization") is essential to ensuring that data is appropriately protected, and done so in the most cost-effective manner

The goal is to classify data according to risk associated with a breach to their confidentiality, integrity, and availability

Enables determining the appropriate cost expenditure of security control mitigations required to protect the IT assets

Key Concepts

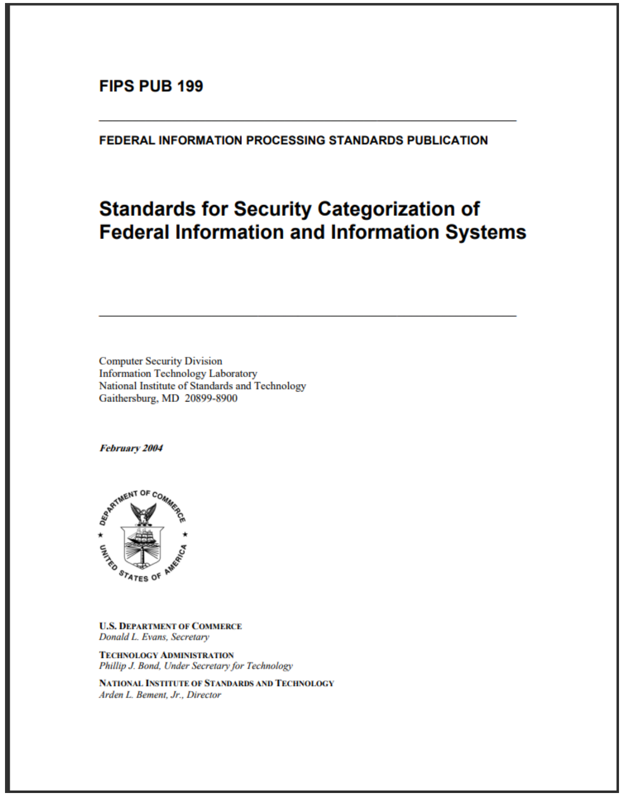
Classification	Grouping of data according to pre-determined types
Cost-Effectiveness	Appropriateness of the level of risk mitigation expenditure
Confidentiality	Restriction who may know about and/or have access to information
Integrity	Confidence that information is complete and unaltered
Availability	Access to information

Question:

How should we determine the information security categorization of an IT asset?

FIPS 199 Standards: Security objectives and impact ratings

Confidentiality
Integrity
CIA
TRIAD
Availability



FIPS PUB 199

FEDERAL INFORMATION PROCESSING STANDARDS PUBLICATION

Standards for Security Categorization of
Federal Information and Information Systems

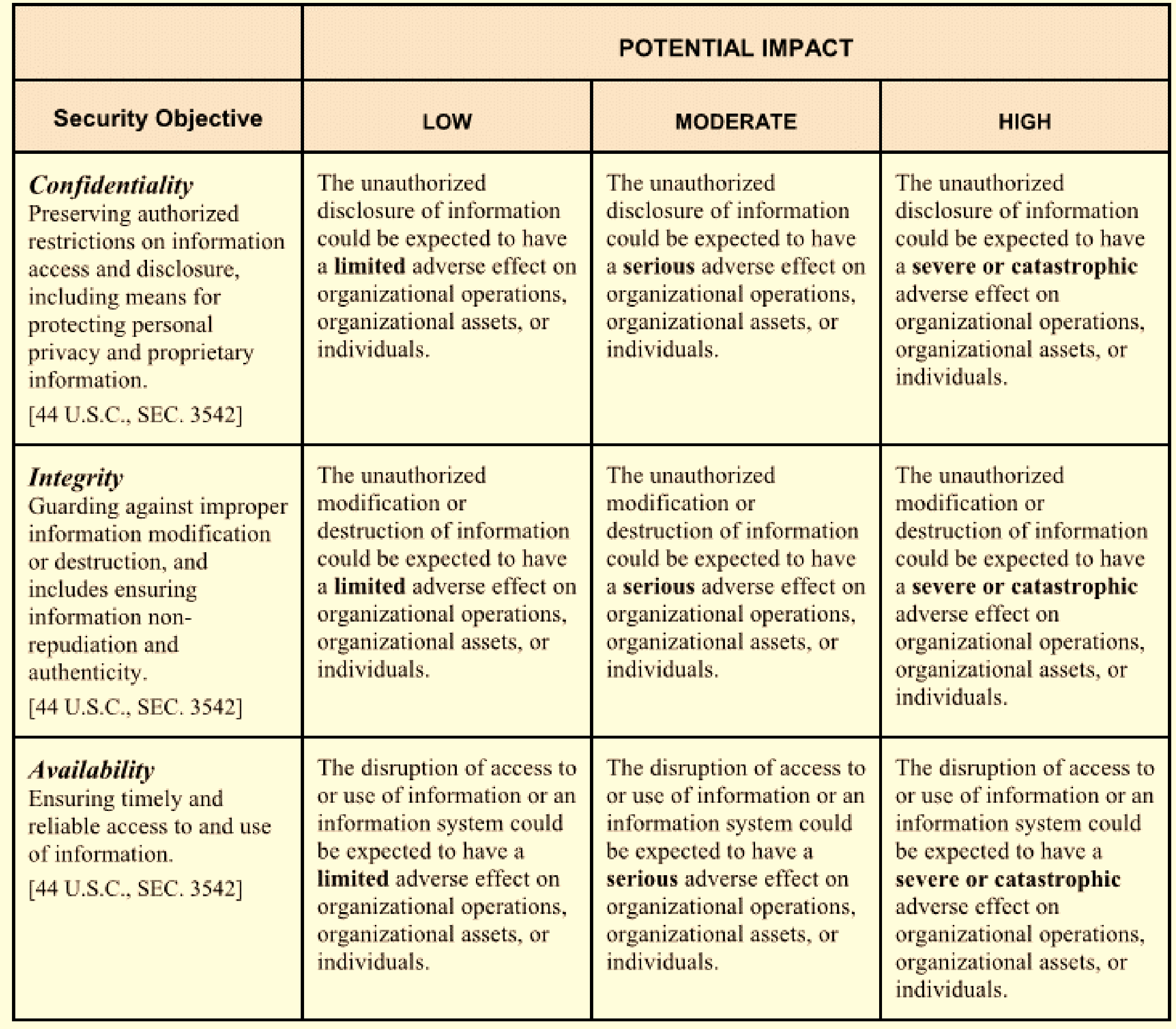
Computer Security Division
Information Technology Laboratory
National Institute of Standards and Technology
Gaithersburg, MD 20899-8900

February 2004

U.S. Department of Commerce
Donald L. Evans, Secretary

Technology Administration
Phillip J. Bond, Under Secretary for Technology

National Institute of Standards and Technology
Arden L. Bement, Jr., Director



	POTENTIAL IMPACT		
Security Objective	**LOW**	**MODERATE**	**HIGH**
Confidentiality Preserving authorized restrictions on information access and disclosure, including means for protecting personal privacy and proprietary information. [44 U.S.C., SEC. 3542]	The unauthorized disclosure of information could be expected to have a **limited** adverse effect on organizational operations, organizational assets, or individuals.	The unauthorized disclosure of information could be expected to have a **serious** adverse effect on organizational operations, organizational assets, or individuals.	The unauthorized disclosure of information could be expected to have a **severe or catastrophic** adverse effect on organizational operations, organizational assets, or individuals.
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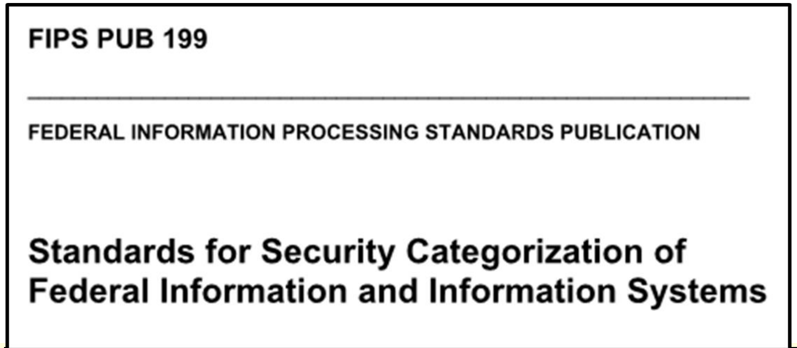
Low: *Limited adverse effect*
Moderate: *Serious adverse effect*
High: *Severe or catastrophic adverse effect*



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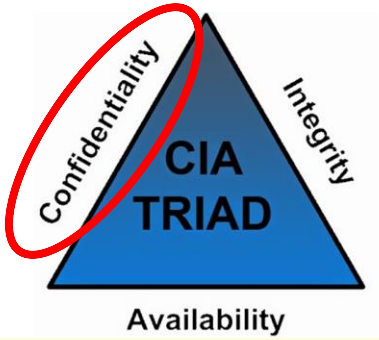

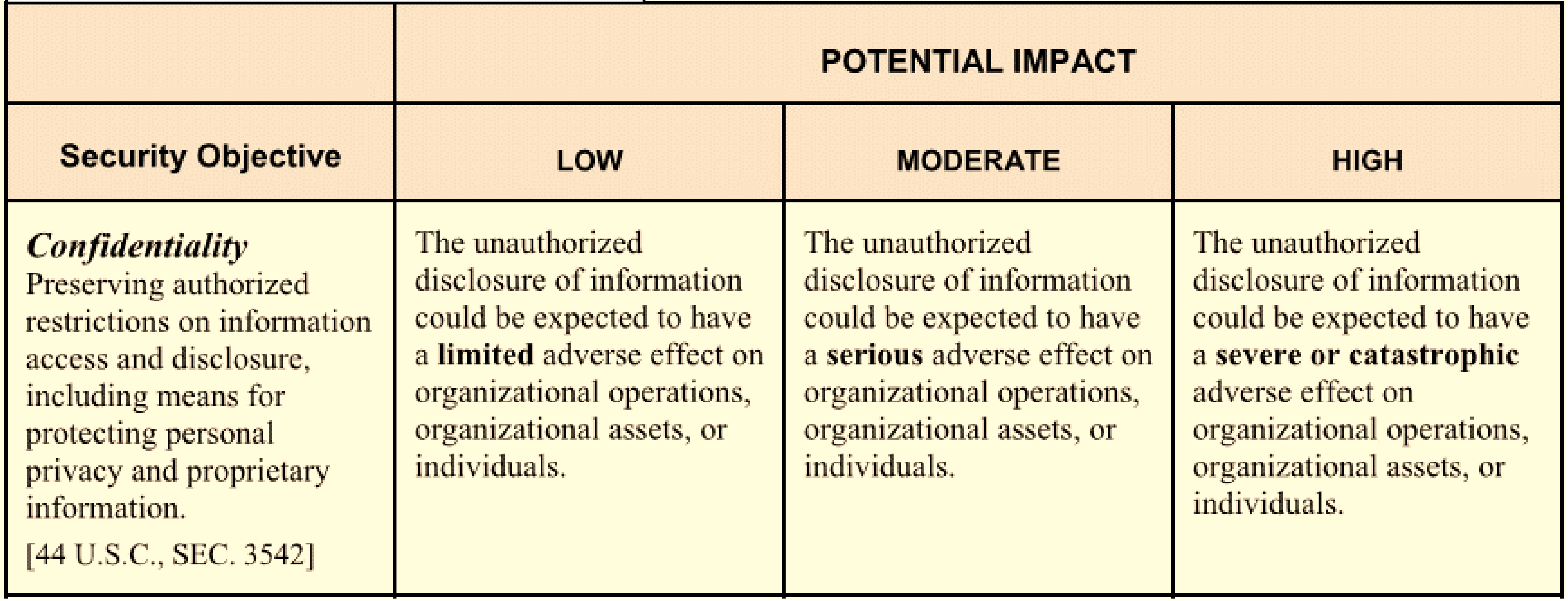

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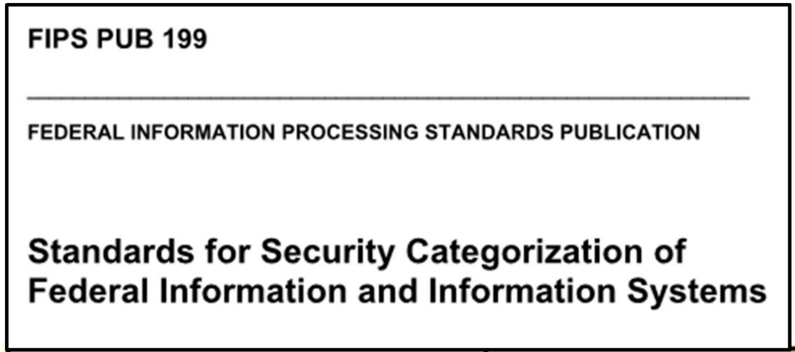

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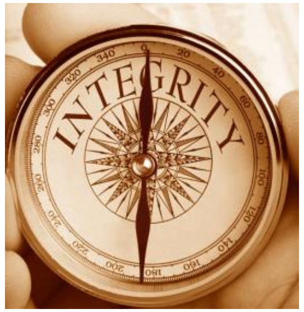

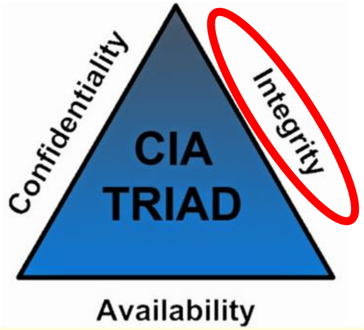

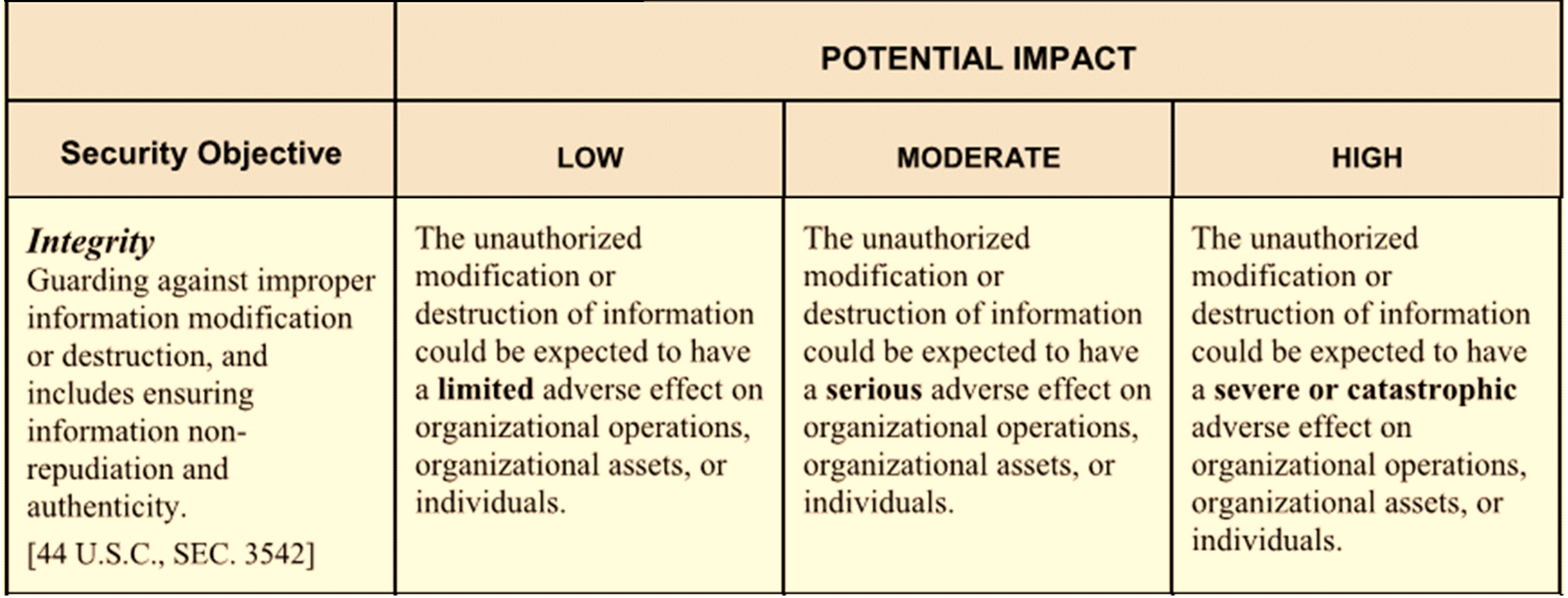

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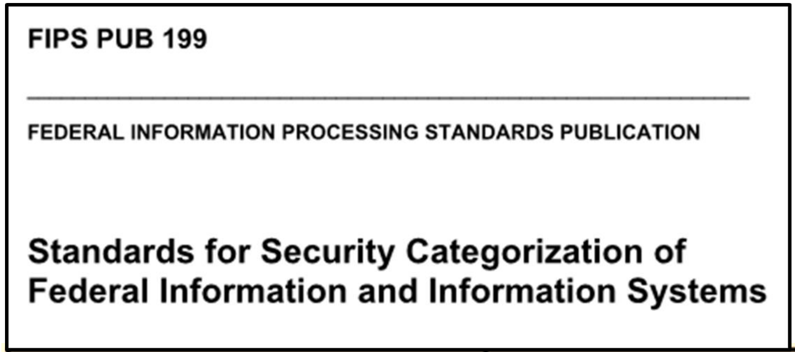

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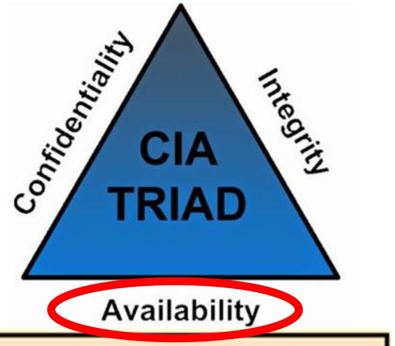

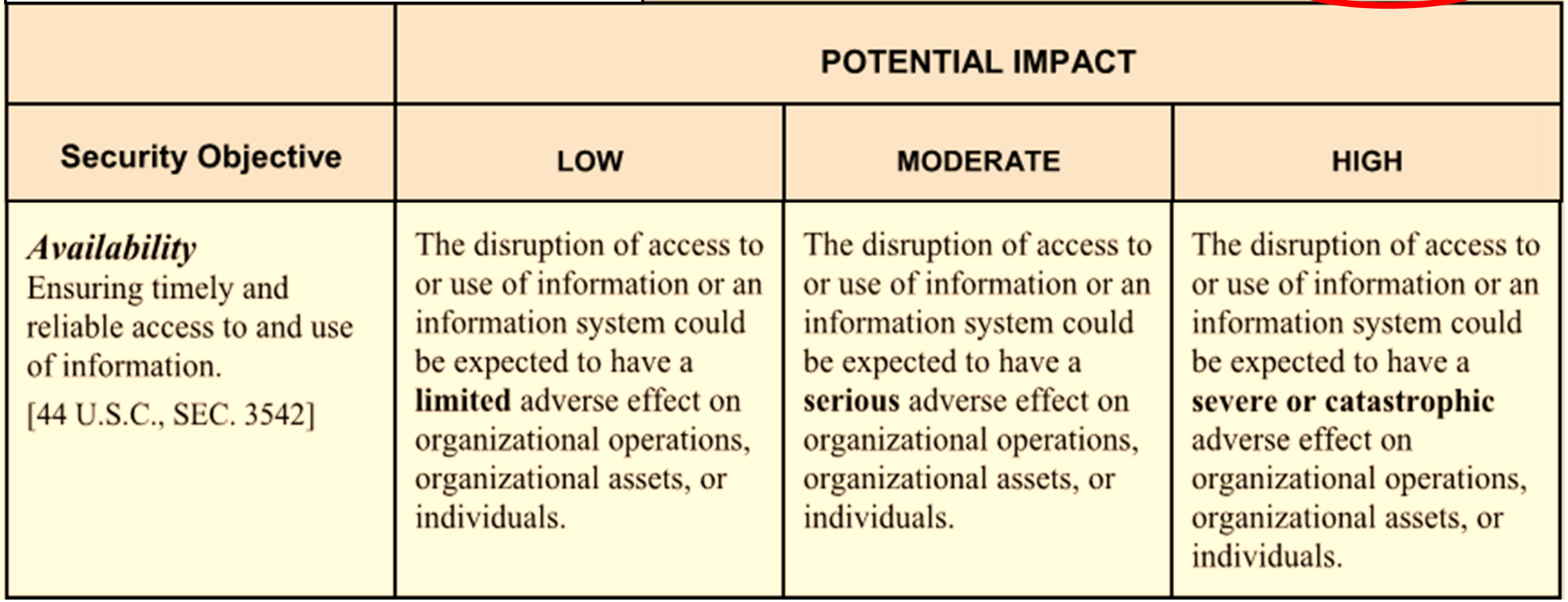

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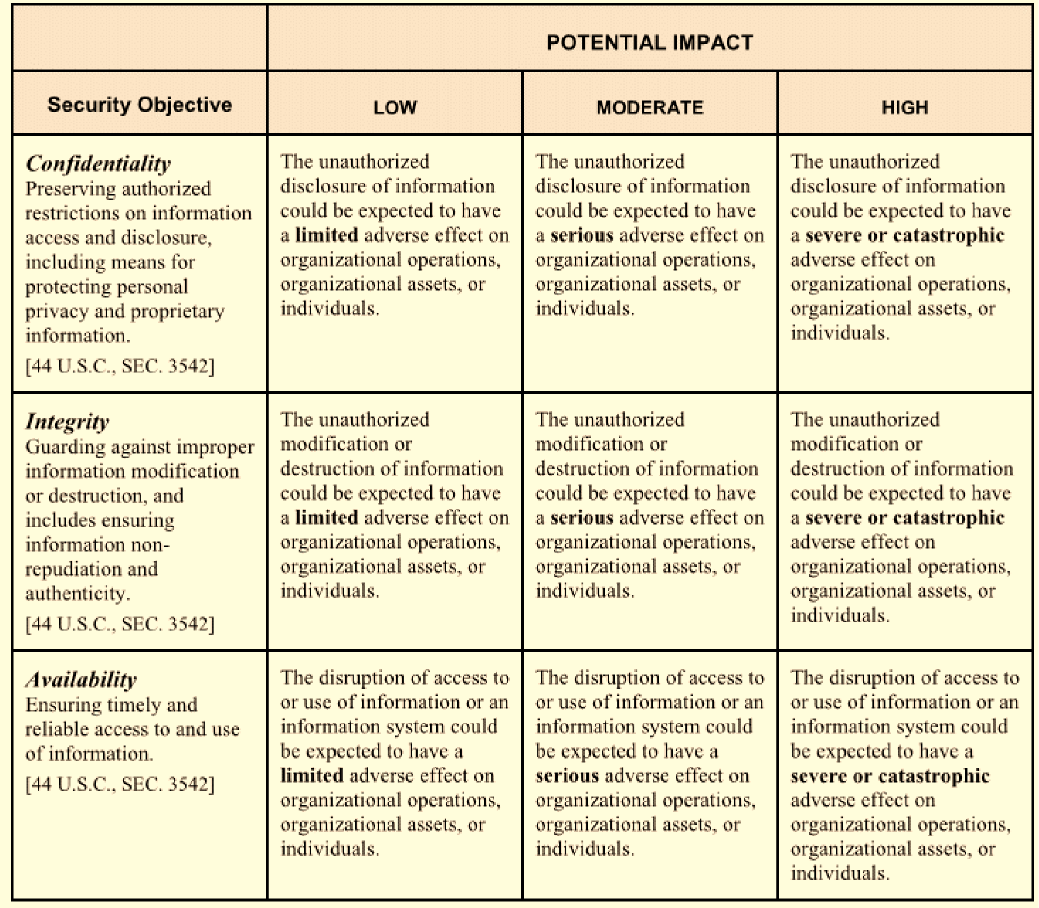
FIPS 199 Information Security Categorization Standard

What kind of Steven's measurement level is used by the FIPS 199 Information Security categorization standard?

Steven's 4 measurement levels

1. Nominal
2. Ordinal
3. Interval
4. Ratio



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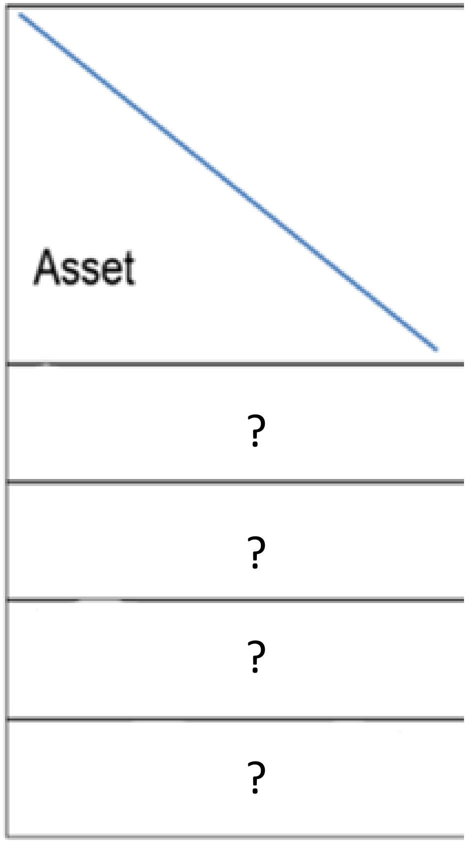
Question:

How do you determine the information security categorization of each dataset on the Dean's computer?

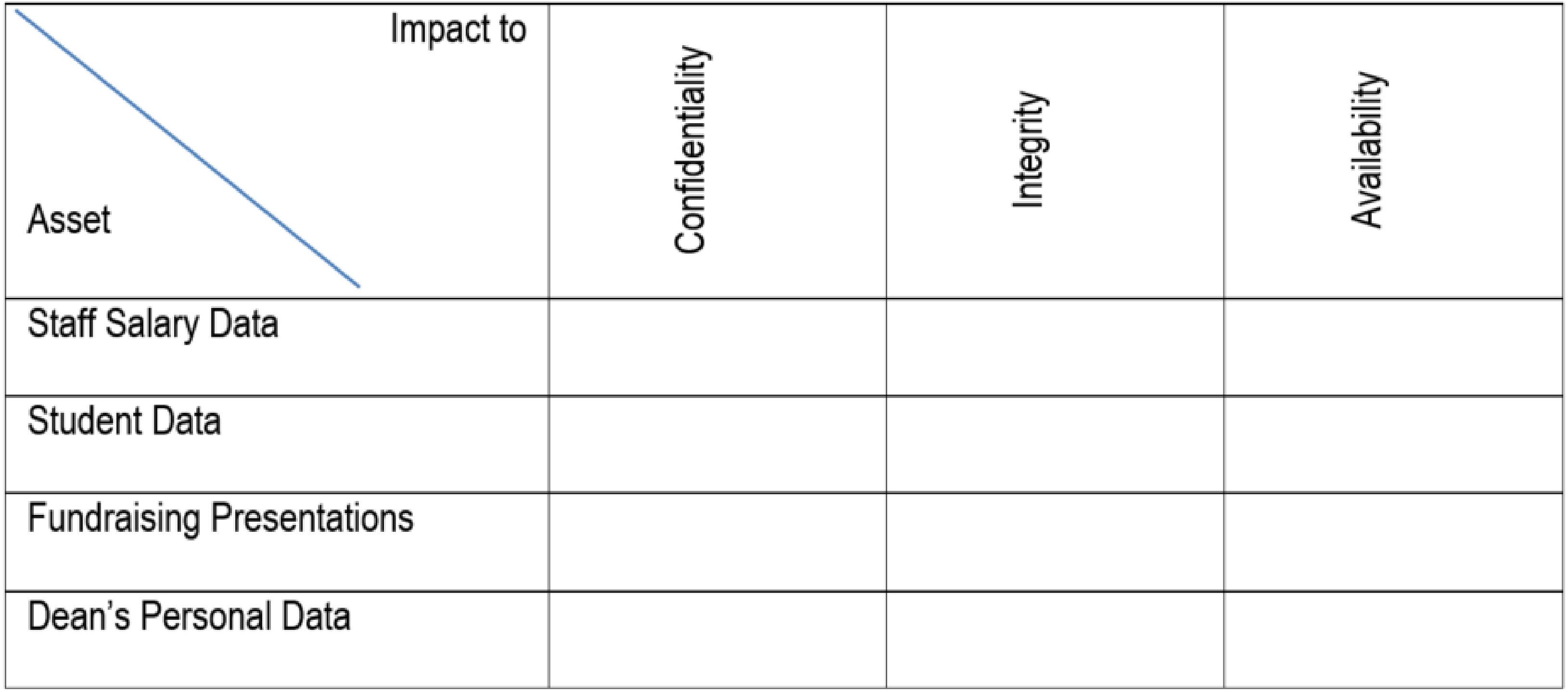
1. *Inventory the (possible) types of information that might be on the Dean's laptop*
2. *Assign information security categorizations to the information inventory*
3. *Provide an overall security categorization for the laptop*

1. Create an inventory of types of datasets possibly stored on the Dean’s laptop



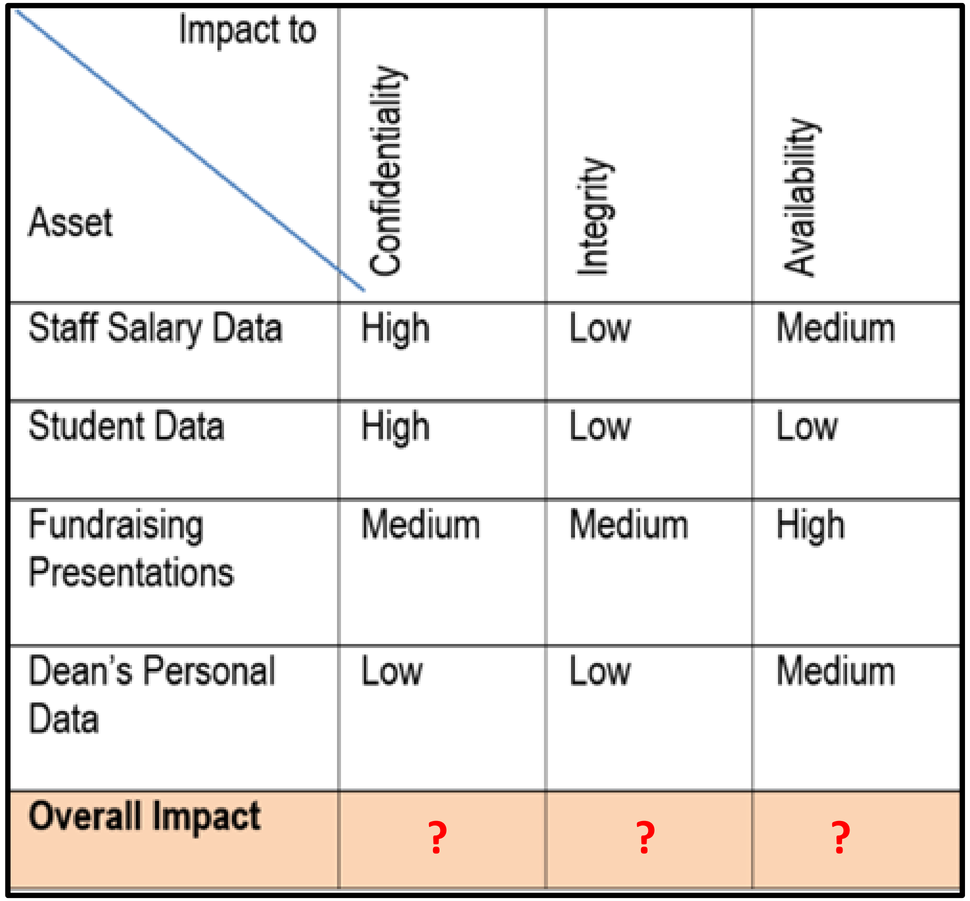
Asset
?
?
?
?

2. Assign information security categorization impact ratings to the data on the Dean's laptop…



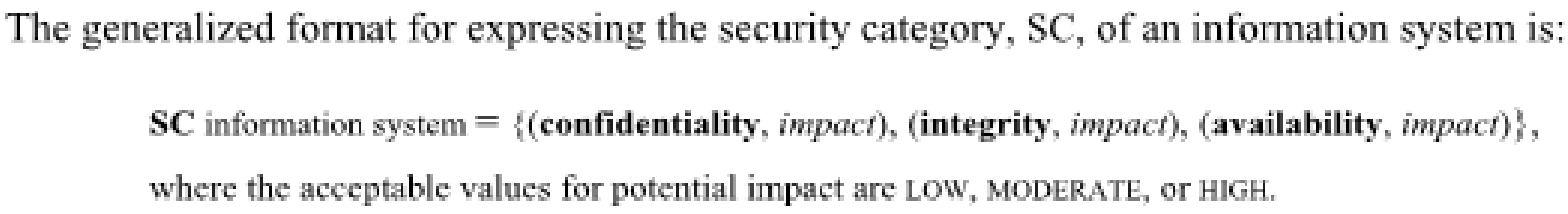
Impact to Asset	Confidentiality	Integrity	Availability
Staff Salary Data			
Student Data			
Fundraising Presentations			
Dean's Personal Data			

What is the FIPS 199 information security categorization of the Dean’s laptop?



Impact to Asset	Confidentiality	Integrity	Availability
Staff Salary Data	High	Low	Medium
Student Data	High	Low	Low
Fundraising Presentations	Medium	Medium	High
Dean’s Personal Data	Low	Low	Medium
Overall Impact	?	?	?

FIPS Pub 199 Standard for determining the security categorization of an information system that contains or transports multiple information types

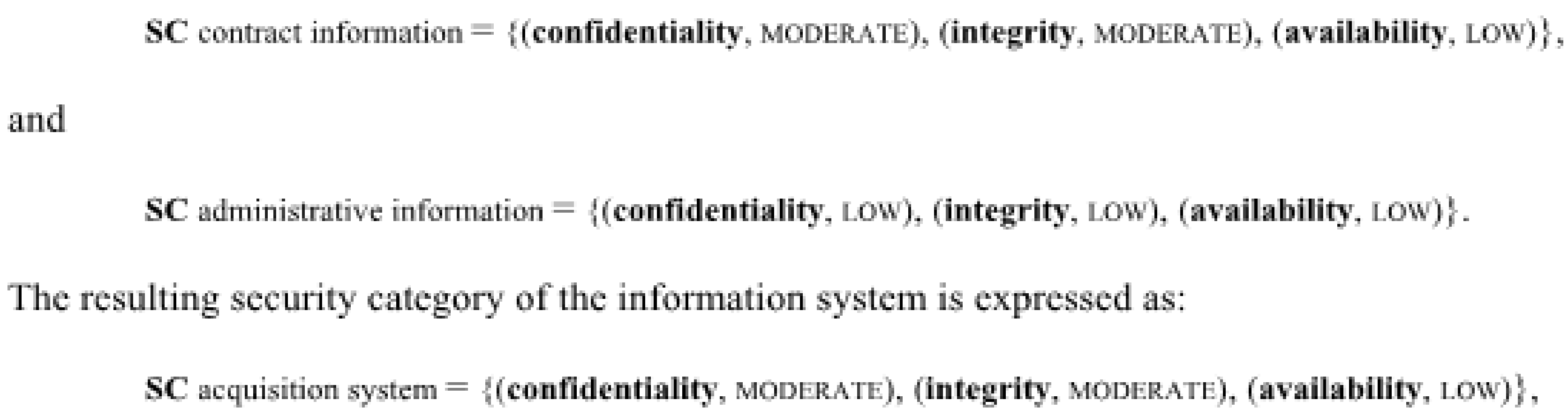


The generalized format for expressing the security category, SC, of an information system is:

SC information system = {(**confidentiality**, *impact*), (**integrity**, *impact*), (**availability**, *impact*)},

where the acceptable values for potential impact are LOW, MODERATE, or HIGH.

Example with multiple information types:



SC contract information = {(**confidentiality**, MODERATE), (**integrity**, MODERATE), (**availability**, LOW)},

and

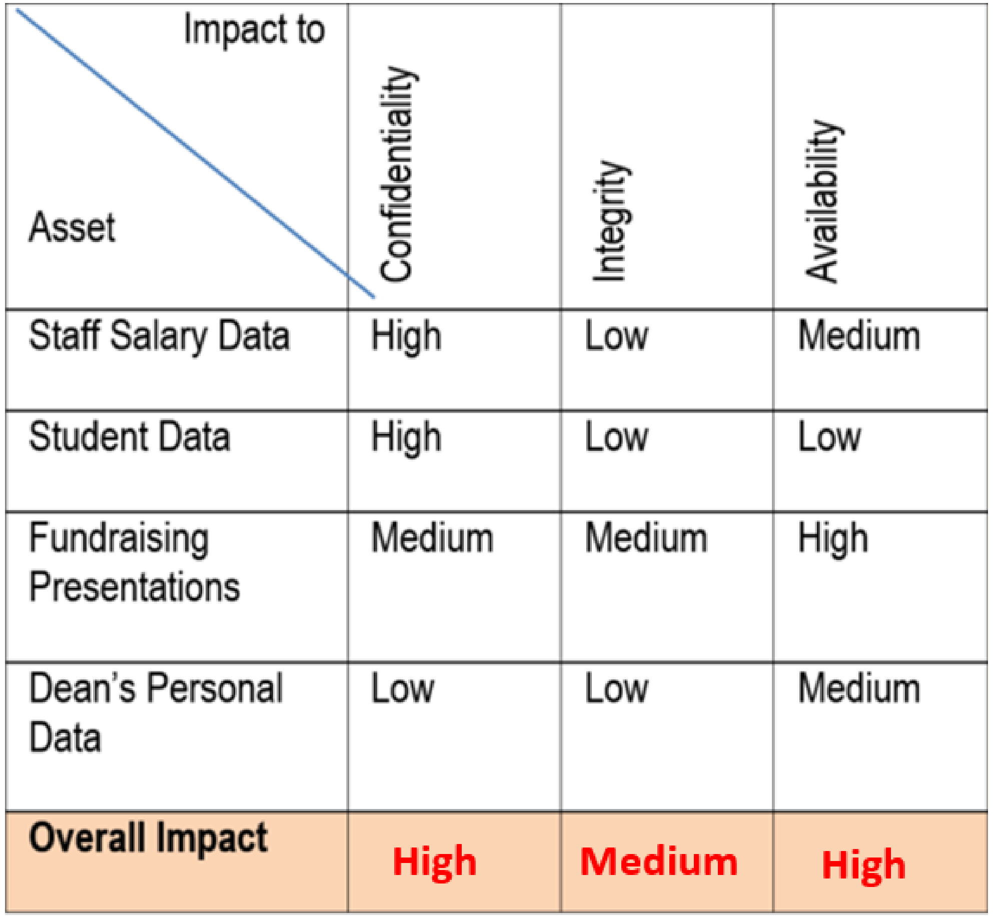
SC administrative information = {(**confidentiality**, LOW), (**integrity**, LOW), (**availability**, LOW)}.

The resulting security category of the information system is expressed as:

SC acquisition system = {(**confidentiality**, MODERATE), (**integrity**, MODERATE), (**availability**, LOW)},

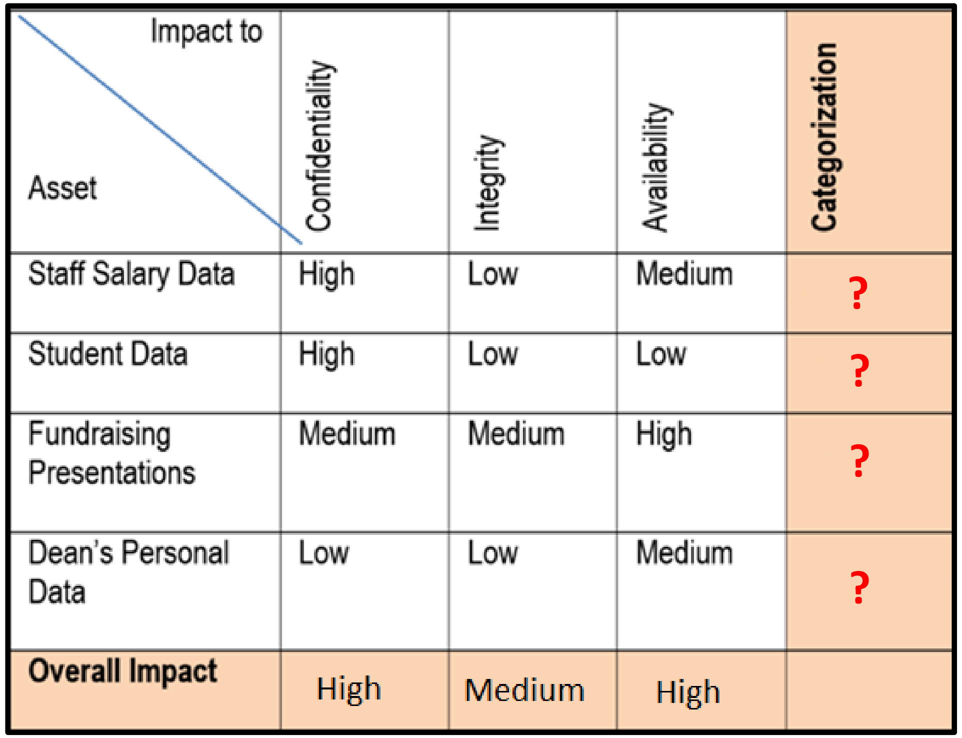
Low: Limited adverse effect
Moderate: Serious adverse effect
High: Severe or catastrophic adverse effect

Overall impact in each of the CIA dimensions is based on the highest impact dataset in each of the dimensions



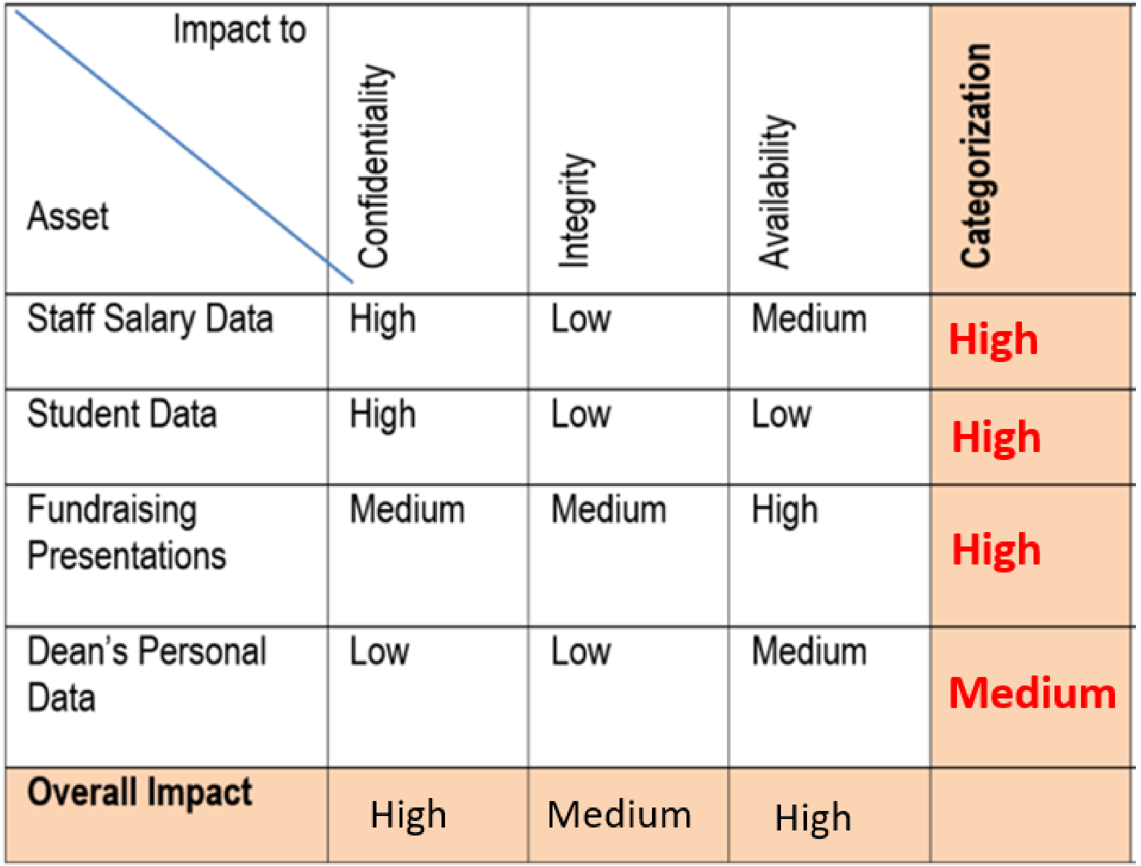
Impact to Asset	Confidentiality	Integrity	Availability
Staff Salary Data	High	Low	Medium
Student Data	High	Low	Low
Fundraising Presentations	Medium	Medium	High
Dean's Personal Data	Low	Low	Medium
Overall Impact	**High**	**Medium**	**High**

What single overall information security categorization would you give each dataset on the Dean’s laptop?



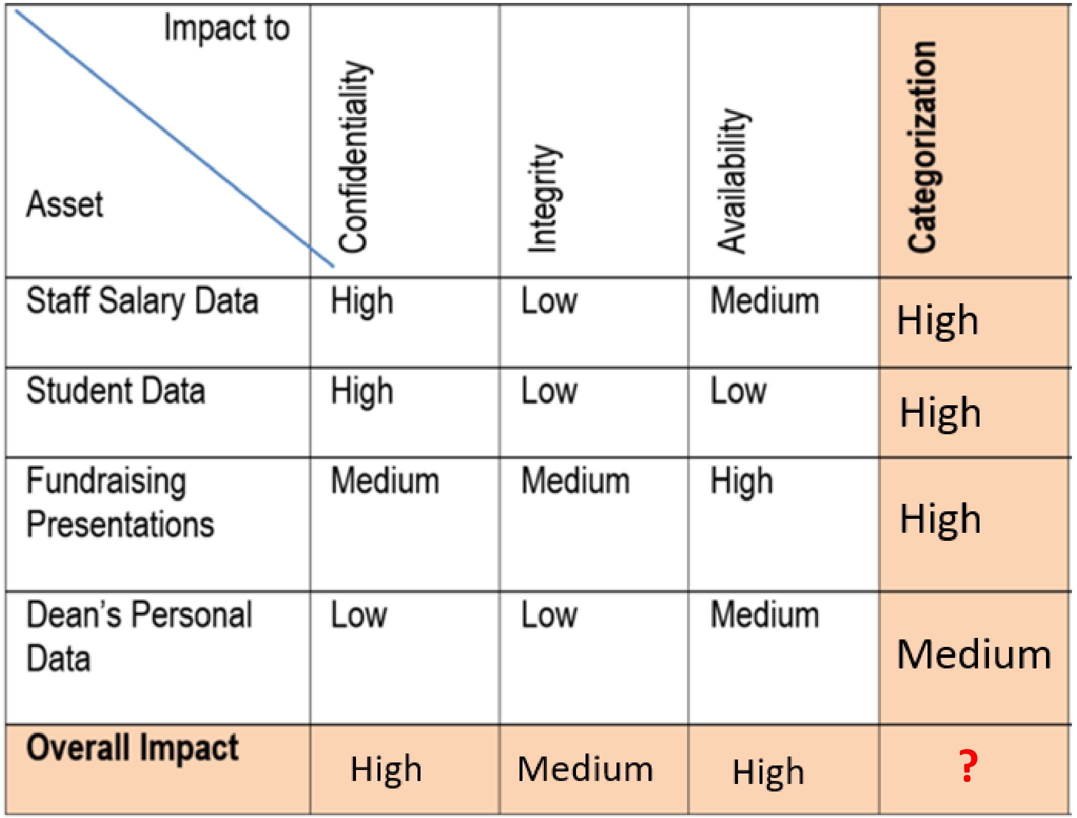
Impact to Asset	Confidentiality	Integrity	Availability	Categorization
Staff Salary Data	High	Low	Medium	?
Student Data	High	Low	Low	?
Fundraising Presentations	Medium	Medium	High	?
Dean’s Personal Data	Low	Low	Medium	?
Overall Impact	High	Medium	High	

Single overall information security impact ratings for each dataset on the Dean’s laptop



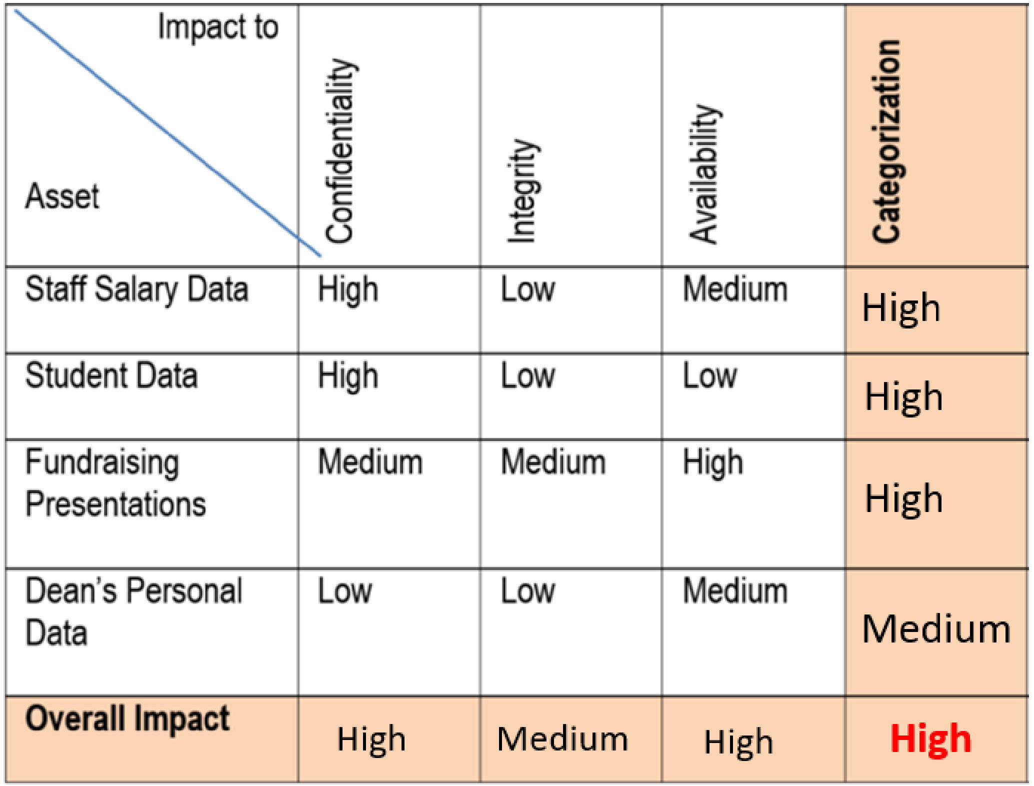
Impact to Asset	Confidentiality	Integrity	Availability	**Categorization**
Staff Salary Data	High	Low	Medium	**High**
Student Data	High	Low	Low	**High**
Fundraising Presentations	Medium	Medium	High	**High**
Dean’s Personal Data	Low	Low	Medium	**Medium**
Overall Impact	High	Medium	High	

What single value would you use to rate the information security requirements of the Dean's laptop?



Impact to Asset	Confidentiality	Integrity	Availability	**Categorization**
Staff Salary Data	High	Low	Medium	High
Student Data	High	Low	Low	High
Fundraising Presentations	Medium	Medium	High	High
Dean's Personal Data	Low	Low	Medium	Medium
Overall Impact	High	Medium	High	?

The single overall information security categorizations for each dataset on the Dean’s laptop



Impact to Asset	Confidentiality	Integrity	Availability	**Categorization**
Staff Salary Data	High	Low	Medium	High
Student Data	High	Low	Low	High
Fundraising Presentations	Medium	Medium	High	High
Dean’s Personal Data	Low	Low	Medium	Medium
Overall Impact	High	Medium	High	**High**

How do you define and relate the following to each other?

- Policy
- Standard
- Guideline
- Procedure

Policy, Standard, Guideline and Procedures

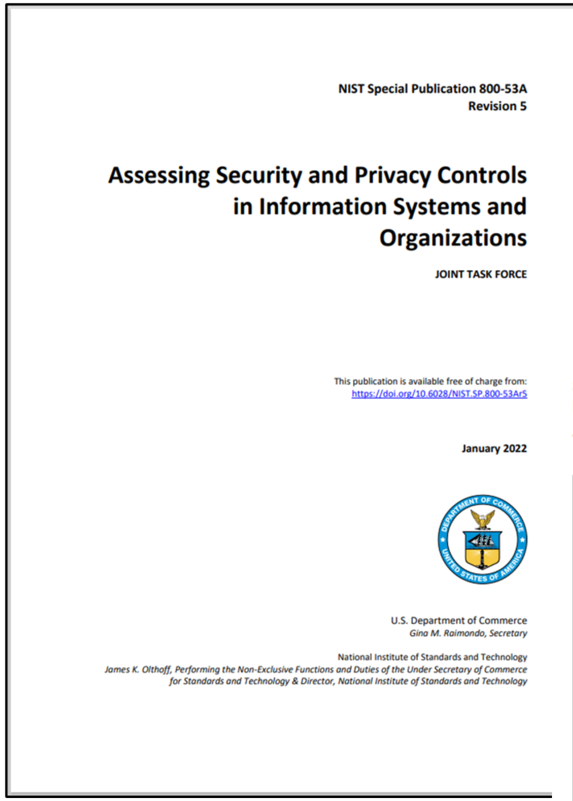
- **Policy:** A formal, brief, and high-level statement or plan that embraces an organization's general beliefs, goals, objectives, and acceptable procedures for a specified subject area. Policies always state required actions, and may include pointers to standards. Policy attributes include the following:
  - Requires compliance (mandatory)
  - Failure to comply results in disciplinary action
  - Focus on desired results, not on means of implementation
  - Further defined by standards and guidelines

- **Standard:** A mandatory action or rule designed to support and conform to a policy.
  - A standard should make a policy more meaningful and effective.
  - A standard must include one or more accepted specifications for hardware, software, or behavior.

- **Guideline:** General statements, recommendations, or administrative instructions designed to achieve the policy's objectives by providing a framework within which to implement procedures.
  - A guideline can change frequently based on the environment and should be reviewed more frequently than standards and policies.
  - A guideline is not mandatory, rather a suggestion of a best practice. Hence "guidelines" and "best practice" are interchangeable

- **Procedures:** Procedures describe the process: who does what, when they do it, and under what criteria. They can be text based or outlined in a process map.
  - A series of steps taken to accomplish an end goal.
  - Procedures define "how" to protect resources and are the mechanisms to enforce policy.
  - Procedures provide a quick reference in times of crisis.
  - Procedures help eliminate the problem of a single point of failure.
  - Also known as a SOP (Standard Operating Procedure)

Policy Example



NIST Special Publication 800-53A
Revision 5

Assessing Security and Privacy Controls in Information Systems and Organizations

JOINT TASK FORCE

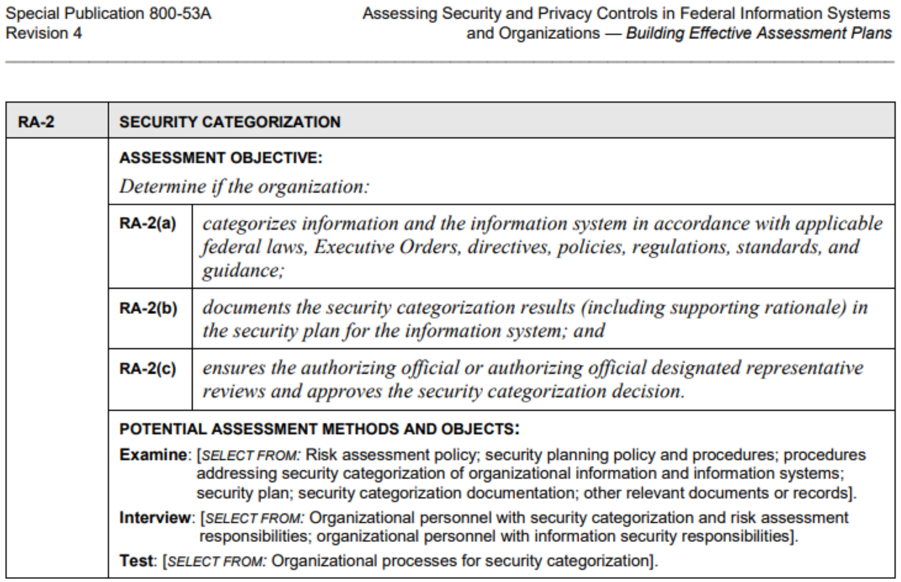
This publication is available free of charge from:
https://doi.org/10.6028/NIST.SP.800-53Ar5

January 2022

U.S. Department of Commerce
Gina M. Raimondo, Secretary

National Institute of Standards and Technology
James K. Olthoff, Performing the Non-Exclusive Functions and Duties of the Under Secretary of Commerce for Standards and Technology & Director, National Institute of Standards and Technology

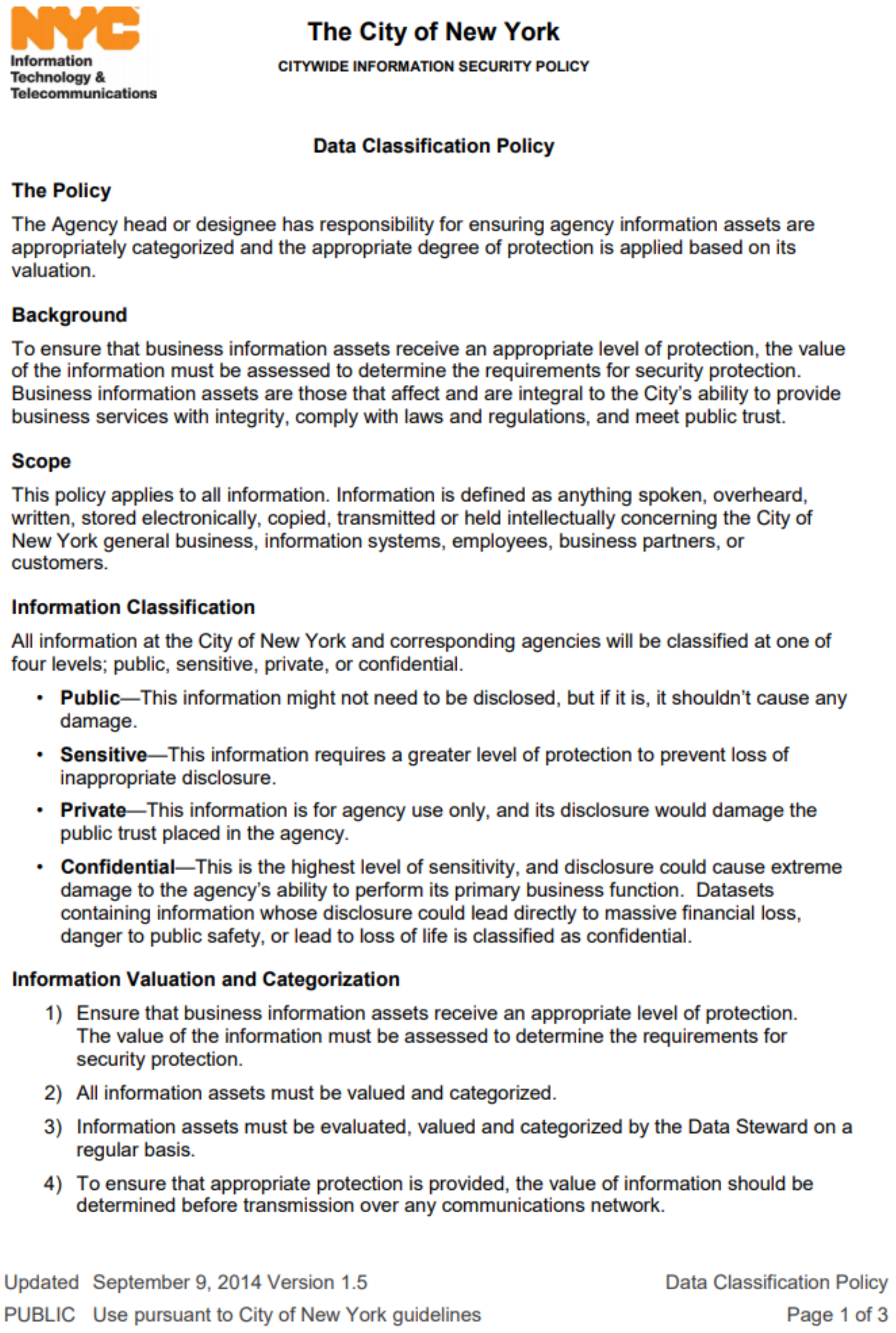
How would you audit this policy?



Special Publication 800-53A
Revision 4

Assessing Security and Privacy Controls in Federal Information Systems
and Organizations — *Building Effective Assessment Plans*

RA-2	SECURITY CATEGORIZATION	
	ASSESSMENT OBJECTIVE: *Determine if the organization:*	
	RA-2(a)	*categorizes information and the information system in accordance with applicable federal laws, Executive Orders, directives, policies, regulations, standards, and guidance;*
	RA-2(b)	*documents the security categorization results (including supporting rationale) in the security plan for the information system; and*
	RA-2(c)	*ensures the authorizing official or authorizing official designated representative reviews and approves the security categorization decision.*
	POTENTIAL ASSESSMENT METHODS AND OBJECTS: **Examine**: [*SELECT FROM:* Risk assessment policy; security planning policy and procedures; procedures addressing security categorization of organizational information and information systems; security plan; security categorization documentation; other relevant documents or records]. **Interview**: [*SELECT FROM:* Organizational personnel with security categorization and risk assessment responsibilities; organizational personnel with information security responsibilities]. **Test**: [*SELECT FROM:* Organizational processes for security categorization].	



NYC
Information Technology & Telecommunications

The City of New York
CITYWIDE INFORMATION SECURITY POLICY

Data Classification Policy

The Policy

The Agency head or designee has responsibility for ensuring agency information assets are appropriately categorized and the appropriate degree of protection is applied based on its valuation.

Background

To ensure that business information assets receive an appropriate level of protection, the value of the information must be assessed to determine the requirements for security protection. Business information assets are those that affect and are integral to the City's ability to provide business services with integrity, comply with laws and regulations, and meet public trust.

Scope

This policy applies to all information. Information is defined as anything spoken, overheard, written, stored electronically, copied, transmitted or held intellectually concerning the City of New York general business, information systems, employees, business partners, or customers.

Information Classification

All information at the City of New York and corresponding agencies will be classified at one of four levels; public, sensitive, private, or confidential.

- **Public**—This information might not need to be disclosed, but if it is, it shouldn't cause any damage.
- **Sensitive**—This information requires a greater level of protection to prevent loss of inappropriate disclosure.
- **Private**—This information is for agency use only, and its disclosure would damage the public trust placed in the agency.
- **Confidential**—This is the highest level of sensitivity, and disclosure could cause extreme damage to the agency's ability to perform its primary business function. Datasets containing information whose disclosure could lead directly to massive financial loss, danger to public safety, or lead to loss of life is classified as confidential.

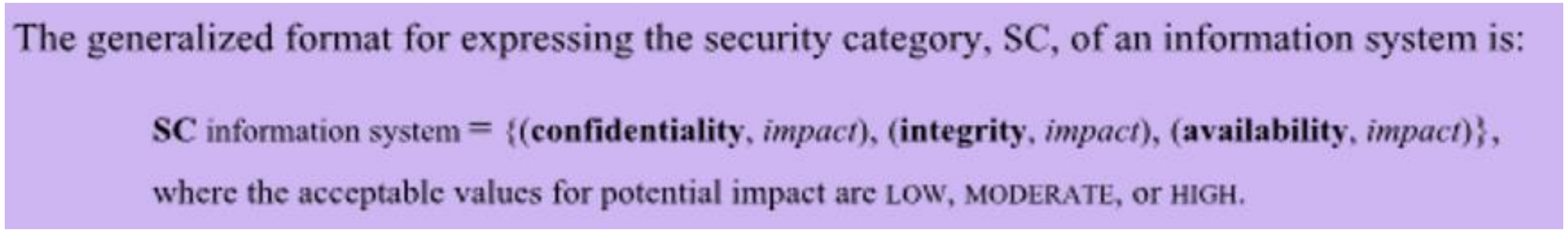
Information Valuation and Categorization

1) Ensure that business information assets receive an appropriate level of protection. The value of the information must be assessed to determine the requirements for security protection.
2) All information assets must be valued and categorized.
3) Information assets must be evaluated, valued and categorized by the Data Steward on a regular basis.
4) To ensure that appropriate protection is provided, the value of information should be determined before transmission over any communications network.

Updated September 9, 2014 Version 1.5 — Data Classification Policy
PUBLIC Use pursuant to City of New York guidelines — Page 1 of 3

Which do you prefer?

FIPS 199 Standard



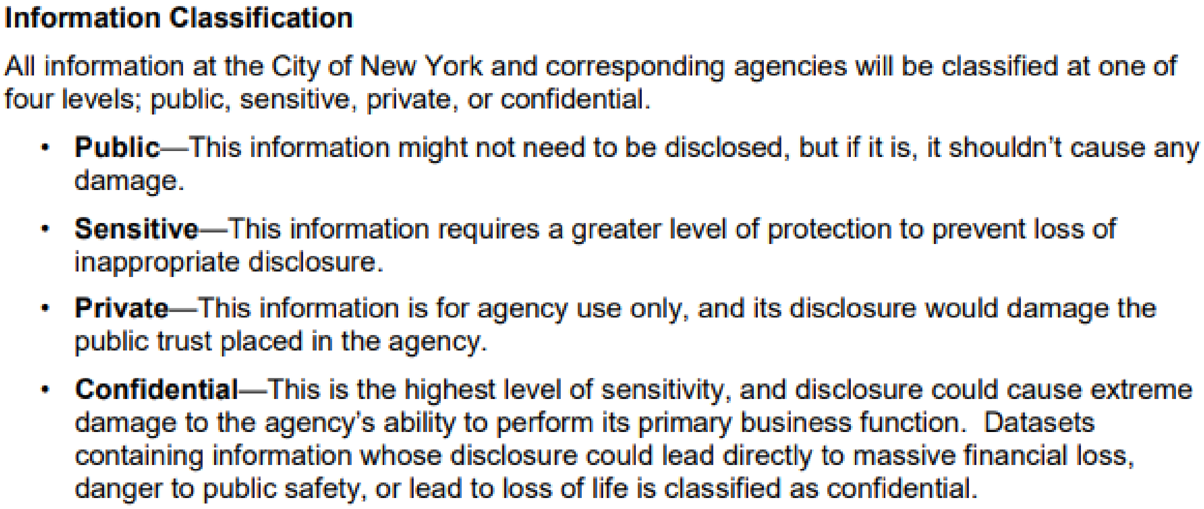
The generalized format for expressing the security category, SC, of an information system is:

SC information system = {(**confidentiality**, *impact*), (**integrity**, *impact*), (**availability**, *impact*)},

where the acceptable values for potential impact are LOW, MODERATE, or HIGH.

…or…

New York City Data Classification Policy



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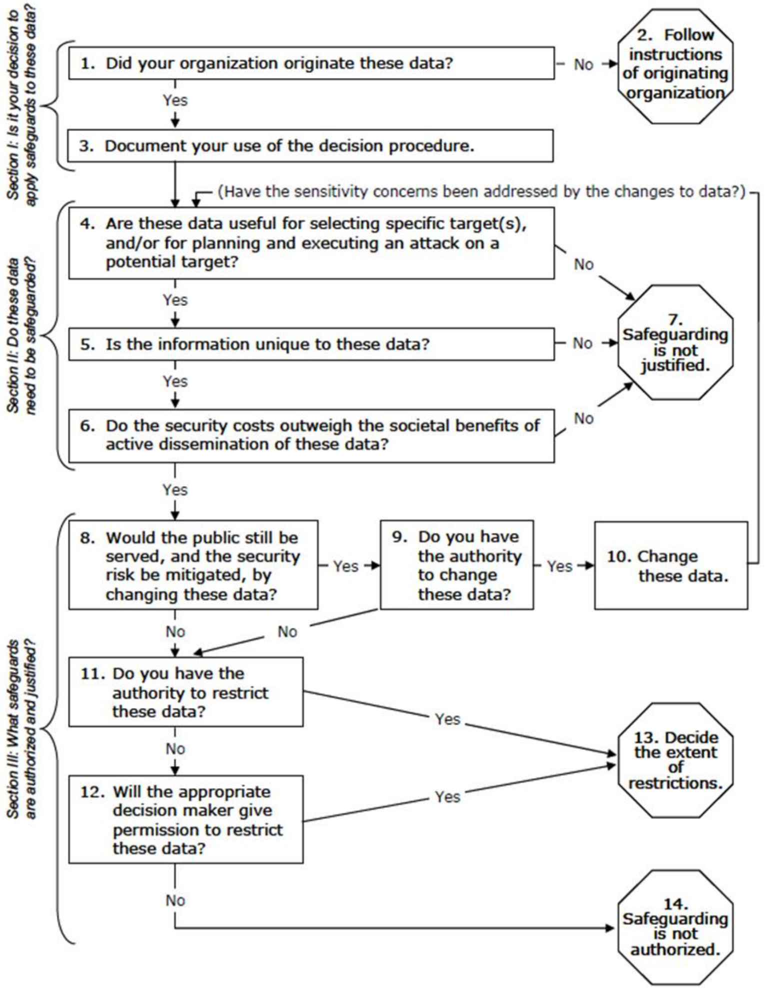
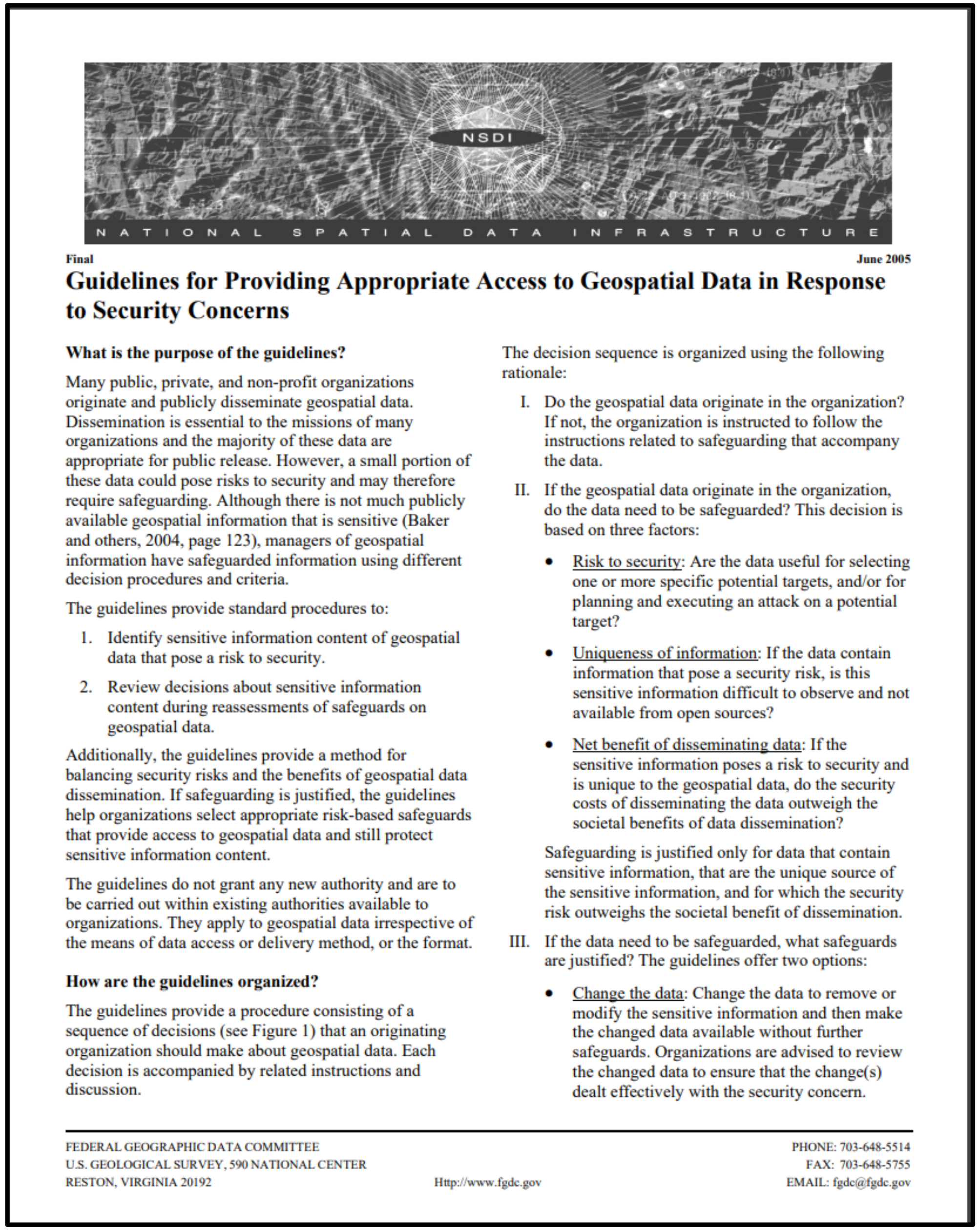
Why?

Analyzing datasets based on the need for confidentiality



Section I: Is it your decision to apply safeguards to these data?
1. Did your organization originate these data?
No
2. Follow instructions of originating organization
Yes
3. Document your use of the decision procedure.
(Have the sensitivity concerns been addressed by the changes to data?)
Section II: Do these data need to be safeguarded?
4. Are these data useful for selecting specific target(s), and/or for planning and executing an attack on a potential target?
No
Yes
5. Is the information unique to these data?
No
7. Safeguarding is not justified.
Yes
6. Do the security costs outweigh the societal benefits of active dissemination of these data?
No
Yes
Section III: What safeguards are authorized and justified?
8. Would the public still be served, and the security risk be mitigated, by changing these data?
Yes
9. Do you have the authority to change these data?
Yes
10. Change these data.
No
No
11. Do you have the authority to restrict these data?
Yes
13. Decide the extent of restrictions.
No
12. Will the appropriate decision maker give permission to restrict these data?
Yes
No
14. Safeguarding is not authorized.



N A T I O N A L   S P A T I A L   D A T A   I N F R A S T R U C T U R E

NSDI

Final June 2005

Guidelines for Providing Appropriate Access to Geospatial Data in Response to Security Concerns

What is the purpose of the guidelines?

Many public, private, and non-profit organizations originate and publicly disseminate geospatial data. Dissemination is essential to the missions of many organizations and the majority of these data are appropriate for public release. However, a small portion of these data could pose risks to security and may therefore require safeguarding. Although there is not much publicly available geospatial information that is sensitive (Baker and others, 2004, page 123), managers of geospatial information have safeguarded information using different decision procedures and criteria.

The guidelines provide standard procedures to:

1. Identify sensitive information content of geospatial data that pose a risk to security.
2. Review decisions about sensitive information content during reassessments of safeguards on geospatial data.

Additionally, the guidelines provide a method for balancing security risks and the benefits of geospatial data dissemination. If safeguarding is justified, the guidelines help organizations select appropriate risk-based safeguards that provide access to geospatial data and still protect sensitive information content.

The guidelines do not grant any new authority and are to be carried out within existing authorities available to organizations. They apply to geospatial data irrespective of the means of data access or delivery method, or the format.

How are the guidelines organized?

The guidelines provide a procedure consisting of a sequence of decisions (see Figure 1) that an originating organization should make about geospatial data. Each decision is accompanied by related instructions and discussion.

The decision sequence is organized using the following rationale:

I. Do the geospatial data originate in the organization? If not, the organization is instructed to follow the instructions related to safeguarding that accompany the data.

II. If the geospatial data originate in the organization, do the data need to be safeguarded? This decision is based on three factors:

- Risk to security: Are the data useful for selecting one or more specific potential targets, and/or for planning and executing an attack on a potential target?
- Uniqueness of information: If the data contain information that pose a security risk, is this sensitive information difficult to observe and not available from open sources?
- Net benefit of disseminating data: If the sensitive information poses a risk to security and is unique to the geospatial data, do the security costs of disseminating the data outweigh the societal benefits of data dissemination?

Safeguarding is justified only for data that contain sensitive information, that are the unique source of the sensitive information, and for which the security risk outweighs the societal benefit of dissemination.

III. If the data need to be safeguarded, what safeguards are justified? The guidelines offer two options:

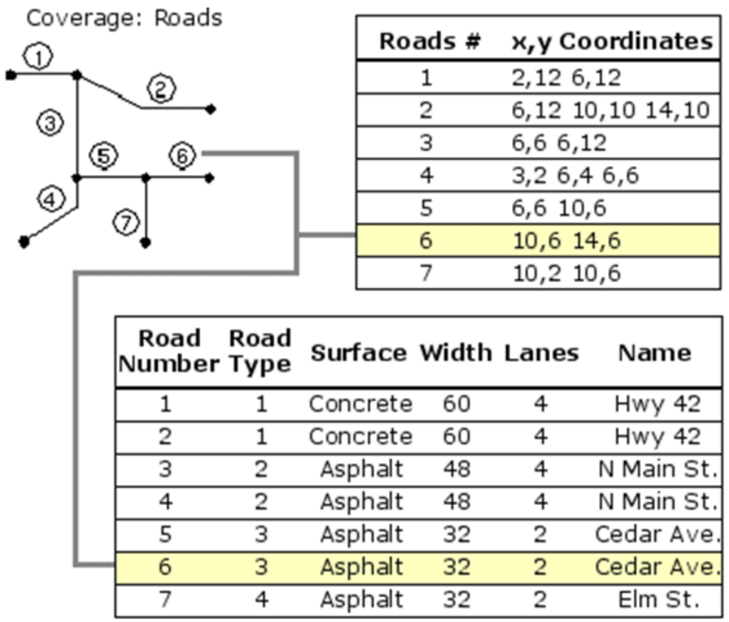
- Change the data: Change the data to remove or modify the sensitive information and then make the changed data available without further safeguards. Organizations are advised to review the changed data to ensure that the change(s) dealt effectively with the security concern.

FEDERAL GEOGRAPHIC DATA COMMITTEE
U.S. GEOLOGICAL SURVEY, 590 NATIONAL CENTER
RESTON, VIRGINIA 20192

Http://www.fgdc.gov

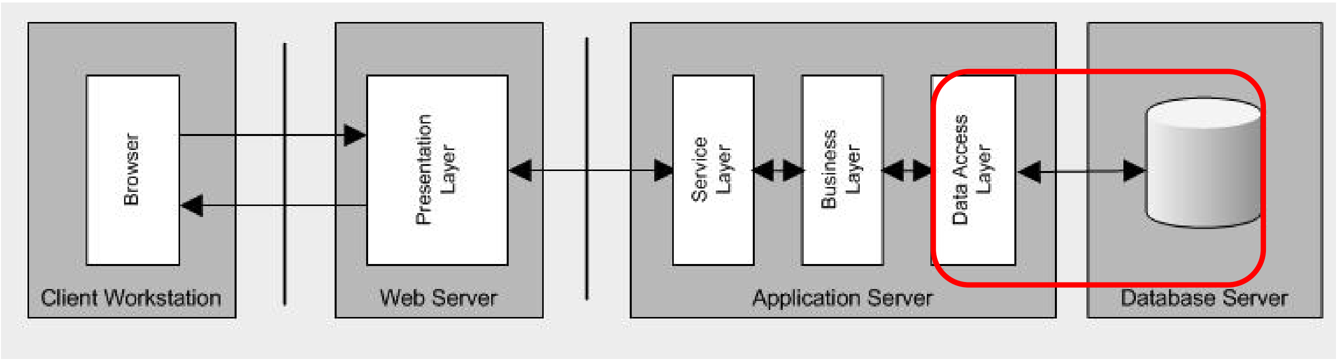
PHONE: 703-648-5514
FAX: 703-648-5755
EMAIL: fgdc@fgdc.gov

Geo-Relational datasets

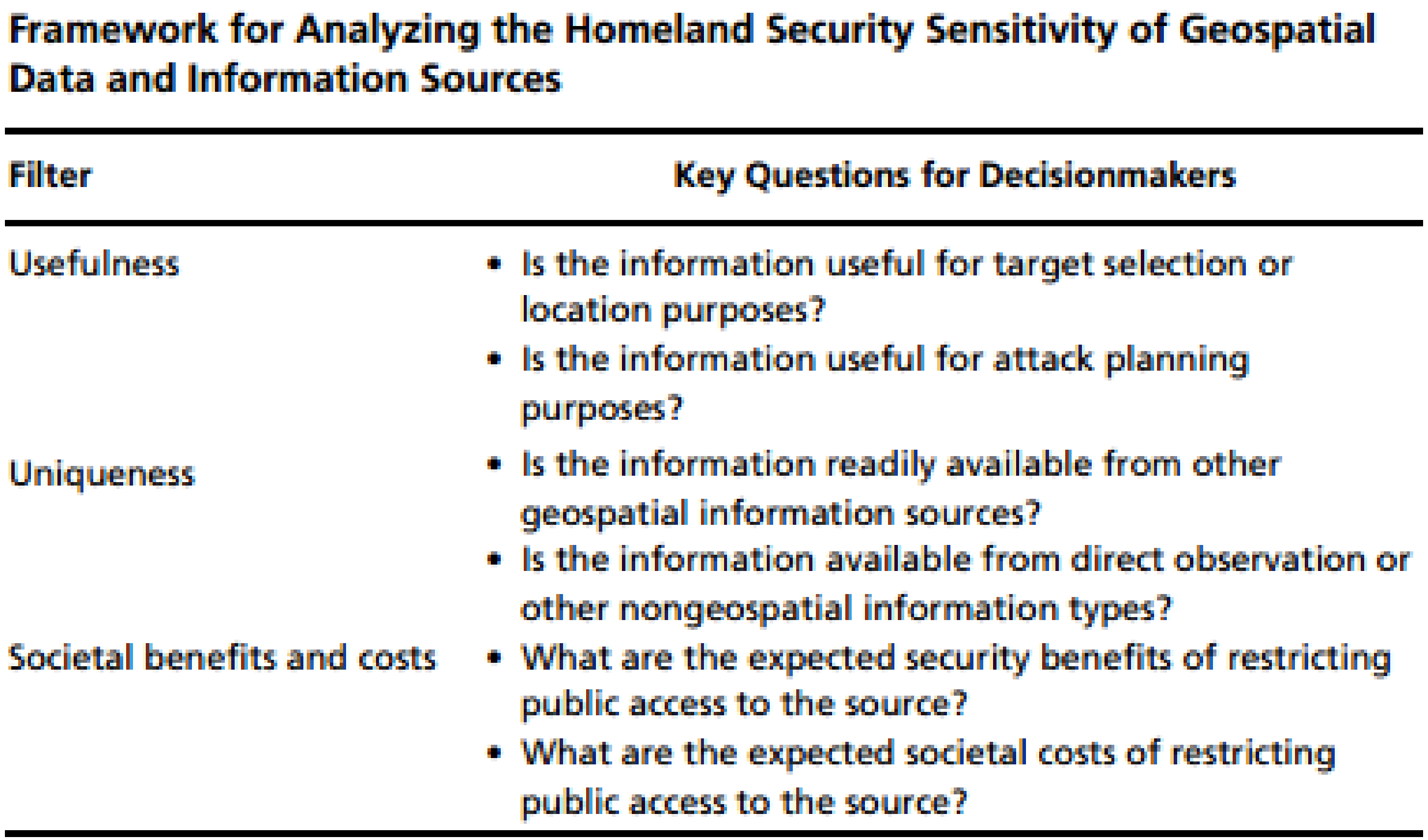


Roads #	x,y Coordinates
1	2,12 6,12
2	6,12 10,10 14,10
3	6,6 6,12
4	3,2 6,4 6,6
5	6,6 10,6
6	10,6 14,6
7	10,2 10,6

Road Number	Road Type	Surface	Width	Lanes	Name
1	1	Concrete	60	4	Hwy 42
2	1	Concrete	60	4	Hwy 42
3	2	Asphalt	48	4	N Main St.
4	2	Asphalt	48	4	N Main St.
5	3	Asphalt	32	2	Cedar Ave.
6	3	Asphalt	32	2	Cedar Ave.
7	4	Asphalt	32	2	Elm St.

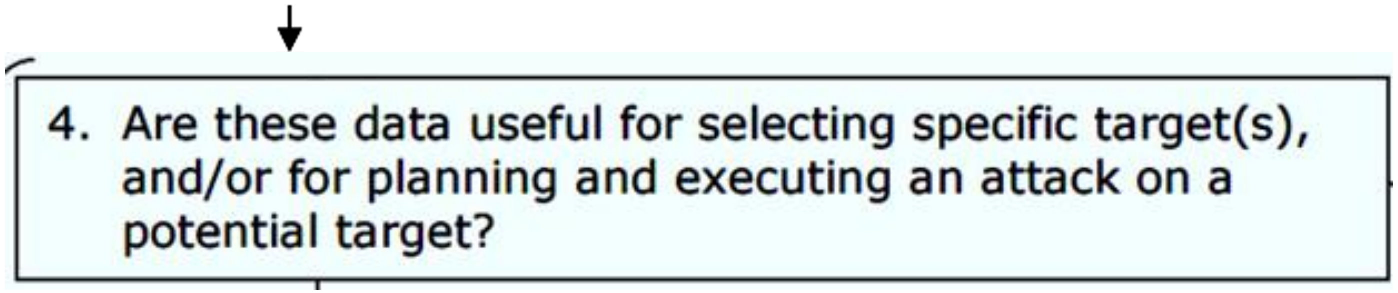


Confidentiality categorization example…



Framework for Analyzing the Homeland Security Sensitivity of Geospatial Data and Information Sources

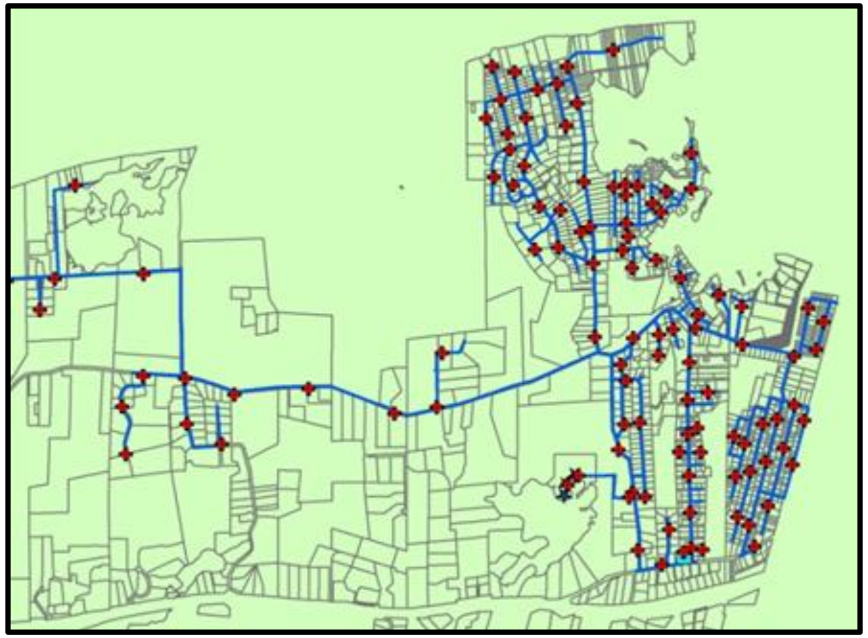
Filter	Key Questions for Decisionmakers
Usefulness	• Is the information useful for target selection or location purposes? • Is the information useful for attack planning purposes?
Uniqueness	• Is the information readily available from other geospatial information sources? • Is the information available from direct observation or other nongeospatial information types?
Societal benefits and costs	• What are the expected security benefits of restricting public access to the source? • What are the expected societal costs of restricting public access to the source?



4. Are these data useful for selecting specific target(s), and/or for planning and executing an attack on a potential target?

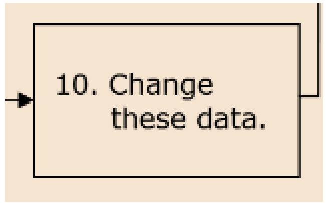
Do the data show choke points” to increase effectiveness of an attack ?

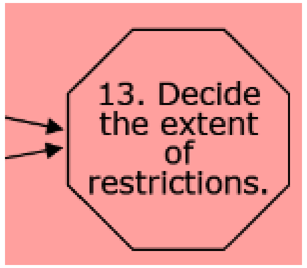
Do the data show opportunities for competitors to gain an advantage?

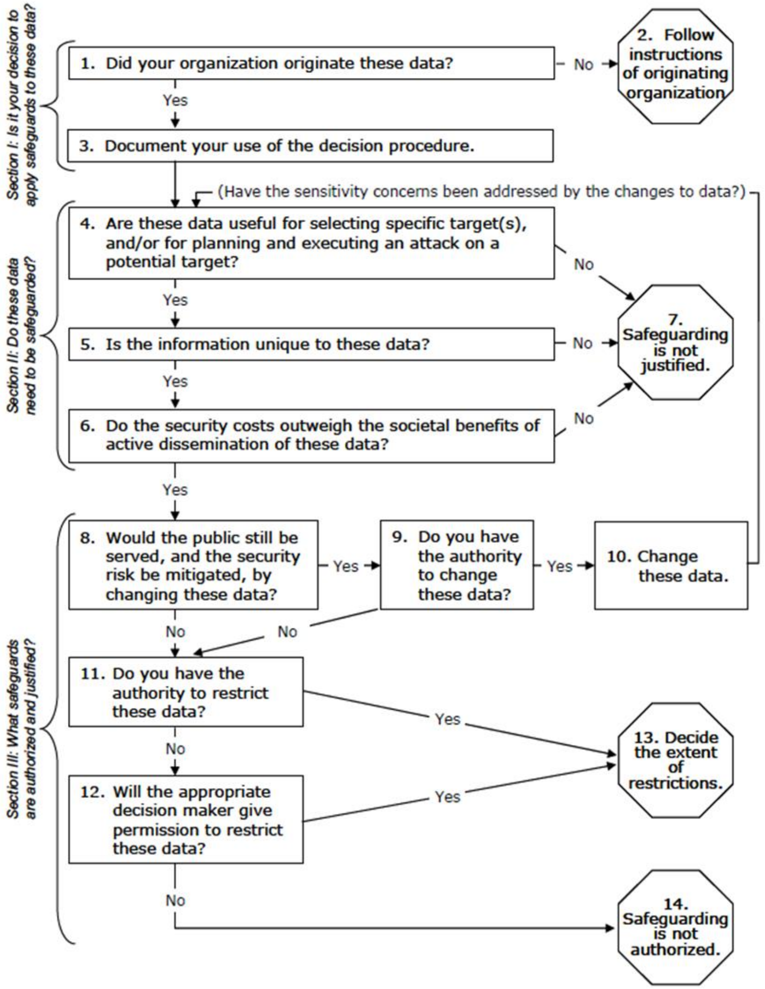


If security risks outweigh benefits of releasing the data to the public, agency can choose to safeguard data by:

- **Modifying data**
  - Remove or reduce detail in offending data elements
    - either in the attributes, spatial representations, or both
- **Restricting access to data**
  - If agency lacks authority to change data, or believes modifying data will undermine its value to the public, then agency can restrict access



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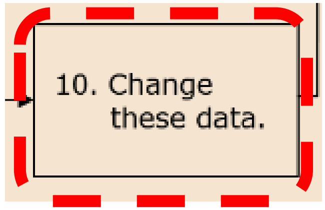
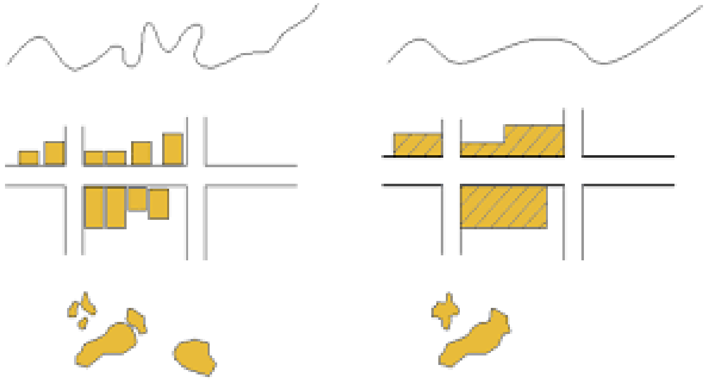
Yes
No
14. Safeguarding is not authorized.

…control/mitigate risk…



10. Change these data.



Before …

…after

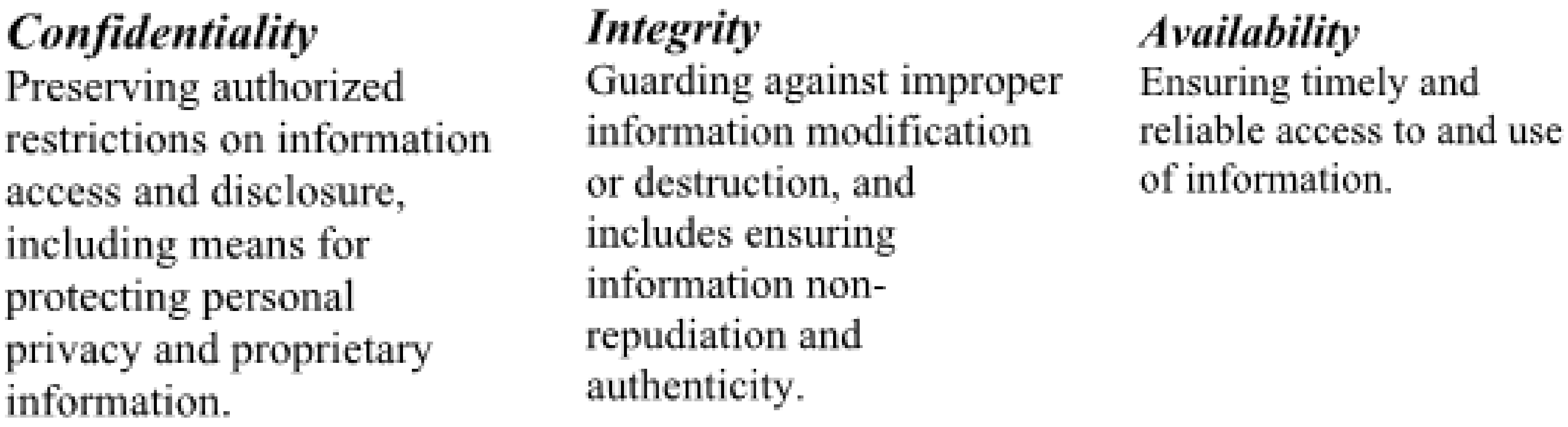
To remove or reduce detail in offending data elements apply techniques of ***<u>Cartographic Generalization</u>***

1. Selective Omission

2. Simplification

3. Combination

What is the security objective of FGDC’s Guidelines ?



Confidentiality
Preserving authorized restrictions on information access and disclosure, including means for protecting personal privacy and proprietary information.

Integrity
Guarding against improper information modification or destruction, and includes ensuring information non-repudiation and authenticity.

Availability
Ensuring timely and reliable access to and use of information.

? ? ?

What FIPS 199 security objectives are at risk by implementing the FGDC’s Guidelines ?

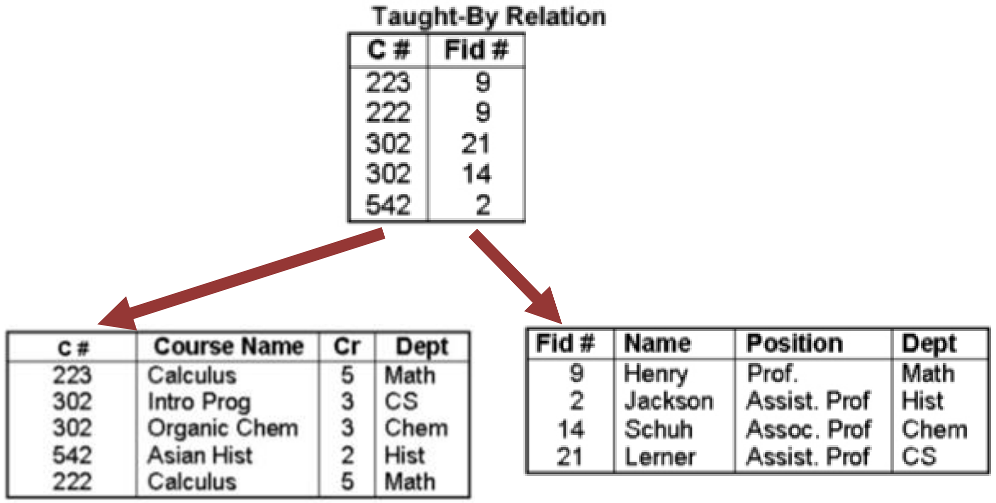
Personally Identifiable Information (PII)

Any information about an individual, including:

1. Any information that can be used to distinguish (i.e. identify) or trace an individual‘s identity, such as:
   - *Name*
   - *Identifying number*
   - *Address*
   - *Asset identifier*
   - *Telephone number*
   - *Personal characteristics*
   - *Personally owned property identifiers*

2. Any other information that is linked or linkable to the identifiers listed in #1:
   - Date of birth
   - Place of birth
   - Race
   - Religion
   - Weight
   - Geographic indicators
   - Medical information
   - Educational information
   - Financial information
   - Employment information
   - …

Linked information



Taught-By Relation

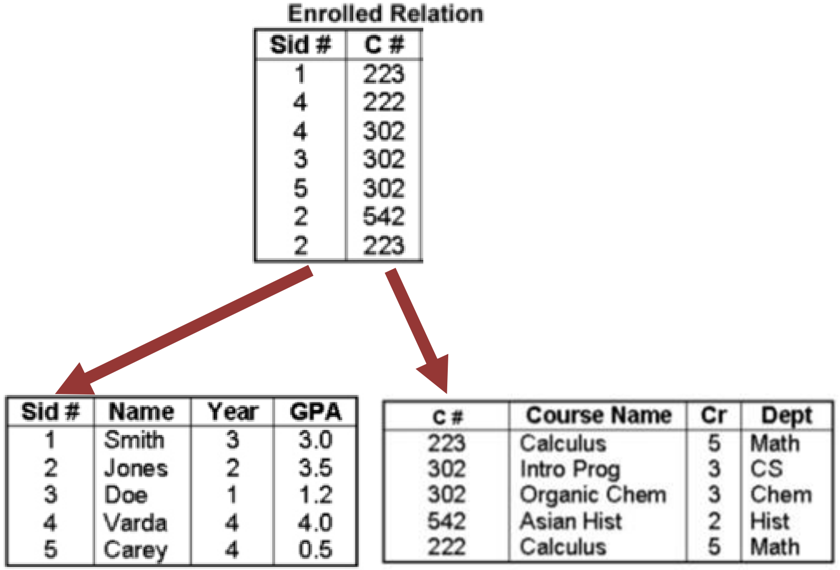
C #	Fid #
223	9
222	9
302	21
302	14
542	2

C #	Course Name	Cr	Dept
223	Calculus	5	Math
302	Intro Prog	3	CS
302	Organic Chem	3	Chem
542	Asian Hist	2	Hist
222	Calculus	5	Math

Course Data Table

Fid #	Name	Position	Dept
9	Henry	Prof.	Math
2	Jackson	Assist. Prof	Hist
14	Schuh	Assoc. Prof	Chem
21	Lerner	Assist. Prof	CS

Faculty Data Table



Enrolled Relation

Sid #	C #
1	223
4	222
4	302
3	302
5	302
2	542
2	223

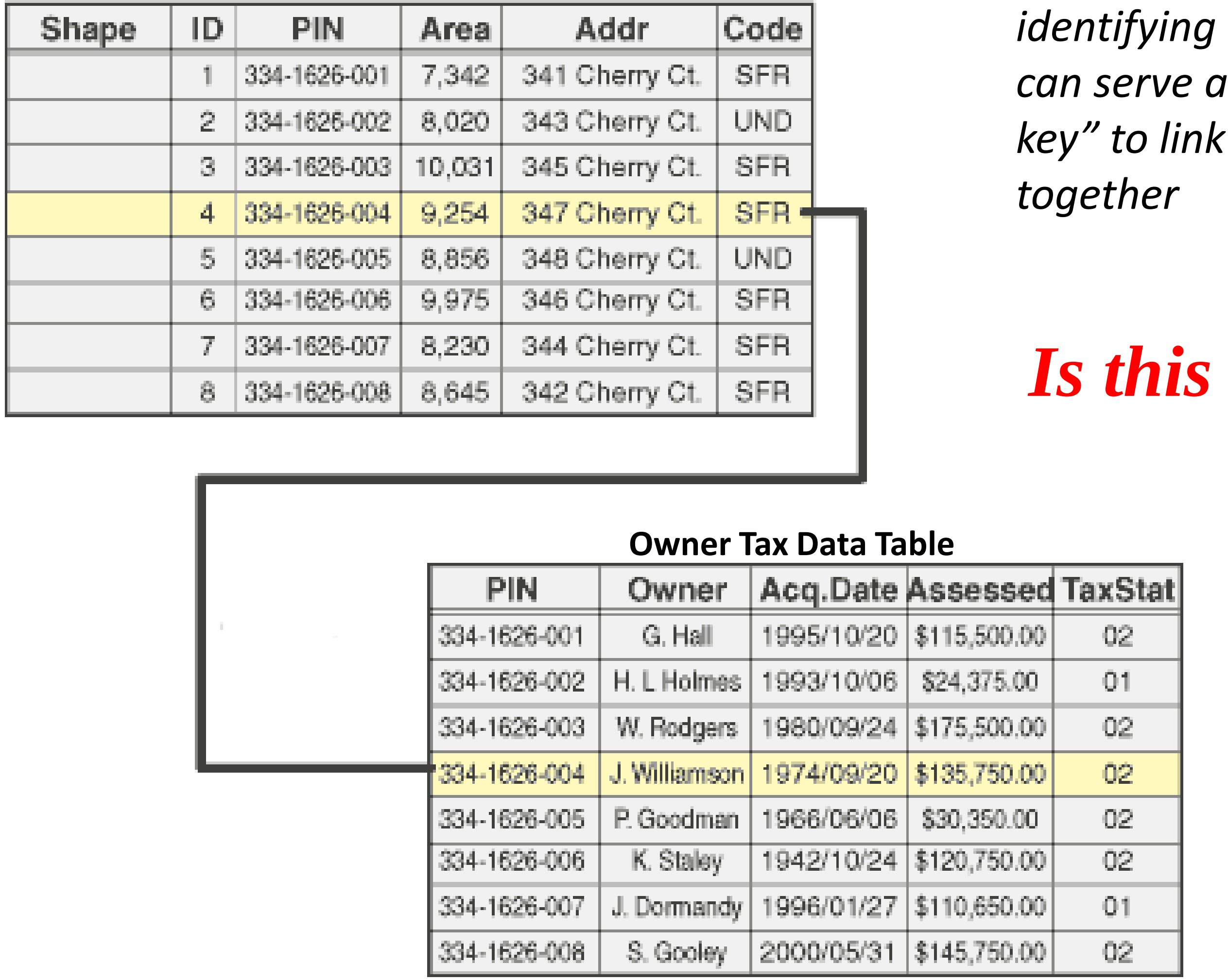
Sid #	Name	Year	GPA
1	Smith	3	3.0
2	Jones	2	3.5
3	Doe	1	1.2
4	Varda	4	4.0
5	Carey	4	0.5

Student Data Table

C #	Course Name	Cr	Dept
223	Calculus	5	Math
302	Intro Prog	3	CS
302	Organic Chem	3	Chem
542	Asian Hist	2	Hist
222	Calculus	5	Math

Course Data Table

Linkable information



Property ("Parcel") Data Table

Shape	ID	PIN	Area	Addr	Code
	1	334-1626-001	7,342	341 Cherry Ct.	SFR
	2	334-1626-002	8,020	343 Cherry Ct.	UND
	3	334-1626-003	10,031	345 Cherry Ct.	SFR
	4	334-1626-004	9,254	347 Cherry Ct.	SFR
	5	334-1626-005	8,856	348 Cherry Ct.	UND
	6	334-1626-006	9,975	346 Cherry Ct.	SFR
	7	334-1626-007	8,230	344 Cherry Ct.	SFR
	8	334-1626-008	8,645	342 Cherry Ct.	SFR

Owner Tax Data Table

PIN	Owner	Acq.Date	Assessed	TaxStat
334-1626-001	G. Hall	1995/10/20	$115,500.00	02
334-1626-002	H. L Holmes	1993/10/06	$24,375.00	01
334-1626-003	W. Rodgers	1980/09/24	$175,500.00	02
334-1626-004	J. Williamson	1974/09/20	$135,750.00	02
334-1626-005	P. Goodman	1966/06/06	$30,350.00	02
334-1626-006	K. Staley	1942/10/24	$120,750.00	02
334-1626-007	J. Dormandy	1996/01/27	$110,650.00	01
334-1626-008	S. Gooley	2000/05/31	$145,750.00	02

PIN is a common identifying number that can serve as a "foreign key" to link the data tables together

Is this PII ?

Personally Identifiable Information (PII)

Any information about an individual maintained by an agency, including:

1. Any information that can be used to distinguish (i.e. identify) or trace an individual's identity, such as:
   - *Name*
   - *Identifying number*
   - *Address*
   - *Asset identifier*
   - *Telephone number*
   - *Personal characteristics*
   - *Personally owned property identifiers*

2. Any other information that is linked or linkable to the identifiers listed in #1:
   - Date of birth
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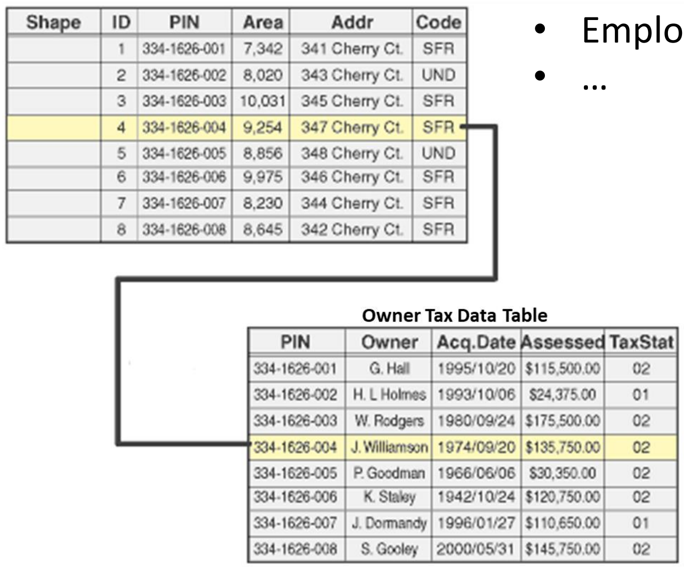
   - Race
   - Religion
   - Weight
   - Geographic indicators
   - Medical information
   - Educational information
   - Financial information
   - Employment information
   - …



Property ("Parcel") Data Table

Shape	ID	PIN	Area	Addr	Code
	1	334-1626-001	7,342	341 Cherry Ct.	SFR
	2	334-1626-002	8,020	343 Cherry Ct.	UND
	3	334-1626-003	10,031	345 Cherry Ct.	SFR
	4	334-1626-004	9,254	347 Cherry Ct.	SFR
	5	334-1626-005	8,856	348 Cherry Ct.	UND
	6	334-1626-006	9,975	346 Cherry Ct.	SFR
	7	334-1626-007	8,230	344 Cherry Ct.	SFR
	8	334-1626-008	8,645	342 Cherry Ct.	SFR

Is this PII ?

Owner Tax Data Table

PIN	Owner	Acq.Date	Assessed	TaxStat
334-1626-001	G. Hall	1995/10/20	$115,500.00	02
334-1626-002	H. L Holmes	1993/10/06	$24,375.00	01
334-1626-003	W. Rodgers	1980/09/24	$175,500.00	02
334-1626-004	J. Williamson	1974/09/20	$135,750.00	02
334-1626-005	P. Goodman	1966/06/06	$30,350.00	02
334-1626-006	K. Staley	1942/10/24	$120,750.00	02
334-1626-007	J. Dormandy	1996/01/27	$110,650.00	01
334-1626-008	S. Gooley	2000/05/31	$145,750.00	02

Test Taking Tip

- Read the answers first -

This contradicts many people's test taking recommendations…

…but, it works. Here's why:

- Quickly alerts you to the type of question to expect
- Focuses your attention in reading the question for meaningful information
- Gives you advanced warning that there may be more than one significant concepts (option to answer in the form "Both A & B")
- Gives you an opportunity to get a sense of the sort of answer the test maker is looking for
- There may be more than one valid answer, but the test maker may be looking for "best mitigation for the situation" or "least risk in the situation"

Test Taking Tip

Example:

A. Transaction authorization
B. Loss or duplication of EDI transmissions
C. Transmission delay
D. Deletion or manipulation of transactions prior to or after establishment of application controls

Test Taking Tip

Example:

Which of the following represents the GREATEST potential risk in an Electronic Data Interchange (EDI) environment?

A. Transaction authorization
B. Loss or duplication of EDI transmissions
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Test Taking Tip

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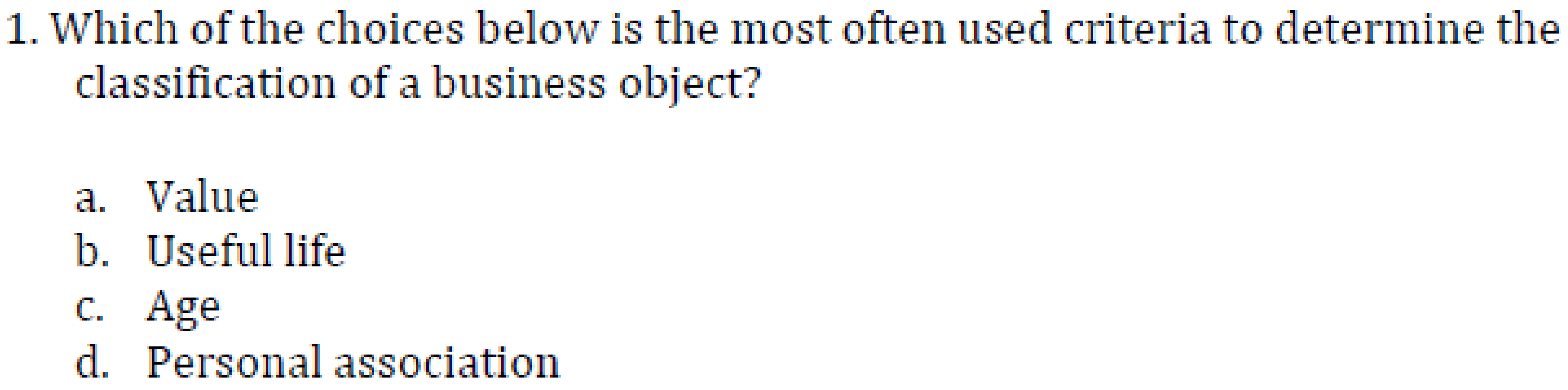
Answer: A

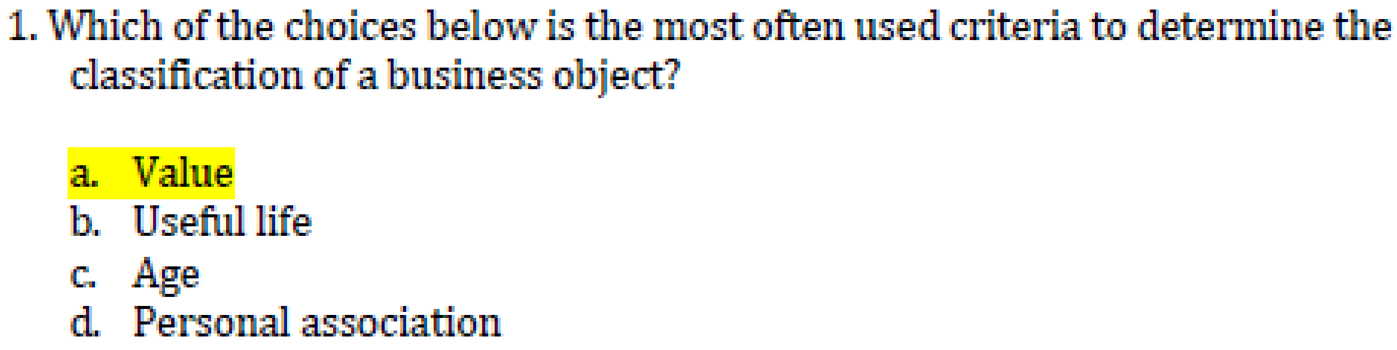
Quiz



1. Which of the choices below is the most often used criteria to determine the classification of a business object?

   a. Value
   b. Useful life
   c. Age
   d. Personal association

Quiz



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   [✓ a. Value]
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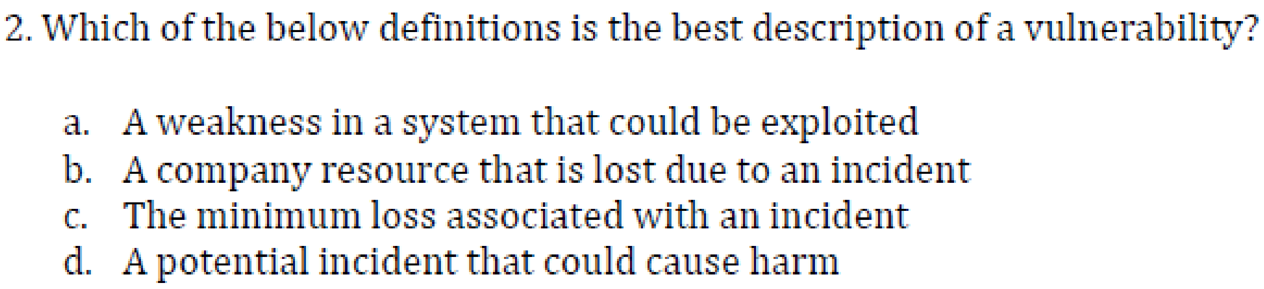
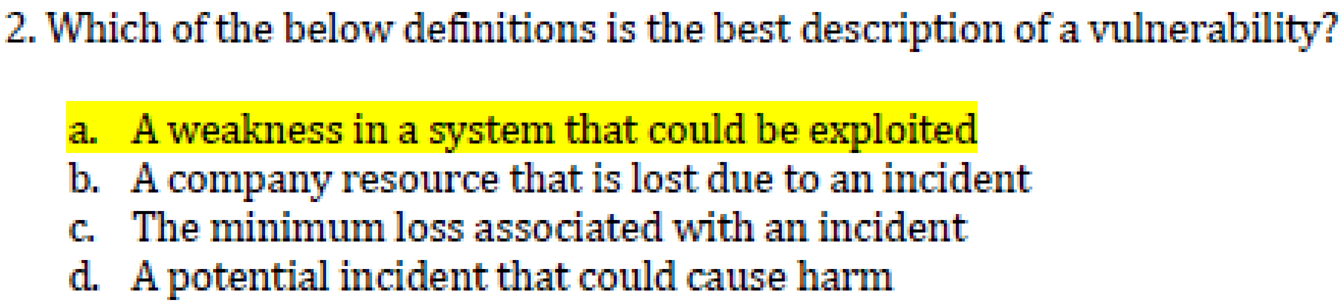
Quiz



2. Which of the below definitions is the best description of a vulnerability?

   a. A weakness in a system that could be exploited
   b. A company resource that is lost due to an incident
   c. The minimum loss associated with an incident
   d. A potential incident that could cause harm

Quiz



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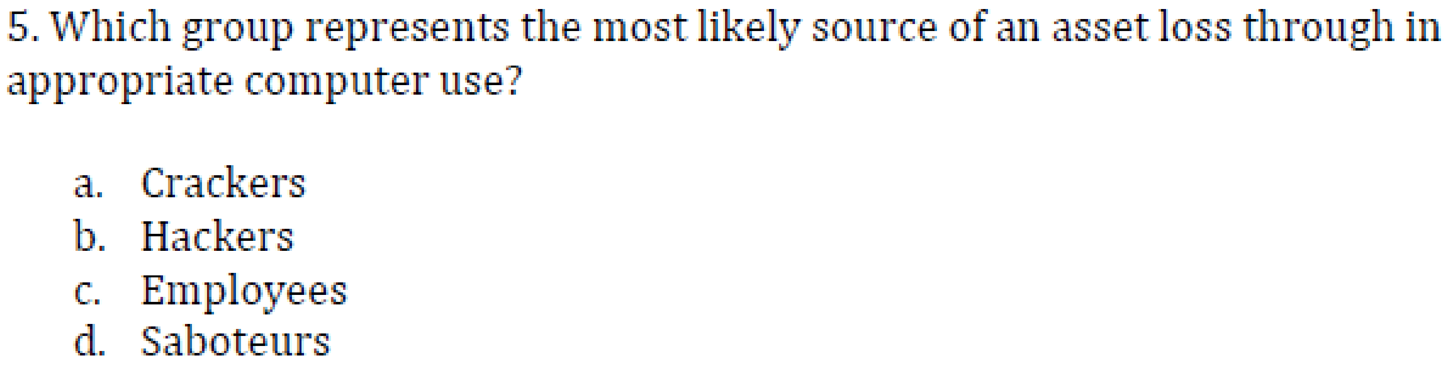
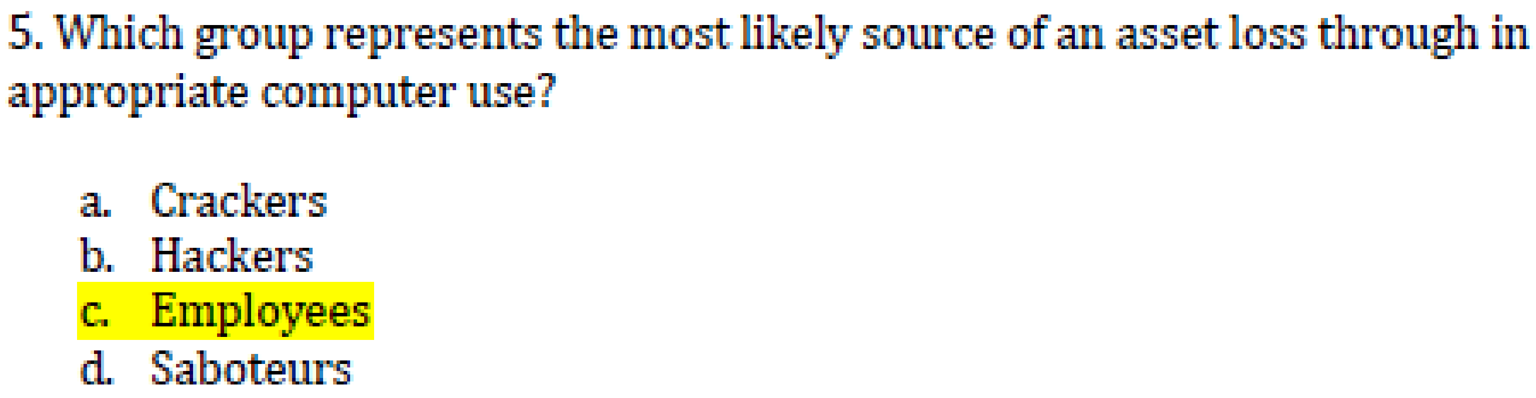


5. Which group represents the most likely source of an asset loss through in appropriate computer use?

a. Crackers
b. Hackers
c. Employees
d. Saboteurs

Quiz



5. Which group represents the most likely source of an asset loss through in appropriate computer use?

a. Crackers
b. Hackers
[✓ c. Employees]
d. Saboteurs

Agenda

- ✓Vocabulary
- ✓Data Classification Process and Models
- ✓Test taking tip
- ✓Quiz