

## Name & Title: - Compliance Management System

**Introduction** :- A compliance management system is a set of processes and tools that help organisations ensure that they are meeting all relevant legal and regulatory requirements. It involves identifying applicable laws and regulations, developing policies and procedures to comply with them, monitoring and testing for compliance, and implementing corrective actions when necessary. A well-designed compliance management system can help organisations avoid legal and financial penalties, maintain their reputation, and ensure ethical business practices..

### Enums Used:

Enum Name	Description
DATA_PRIVACY	This enum value represents compliance related to laws and regulations concerning the protection and privacy of personal data
FINANCIAL_REGULATIONS	This enum value represents compliance related to laws and regulations concerning financial reporting and management
EMPLOYMENT_LAWS	This enum value represents compliance related to laws and regulations concerning employment practices and policies
ENVIRONMENTAL_REGULATIONS	This enum value represents compliance related to laws and regulations concerning environmental protection and sustainability

### Structures Used:

Compliance Incident:

Property	Data Type	Description
type	ComplianceType	An enumerated type that represents the type of compliance incident
description	char[100]	A string that describes the compliance incident in detail
severity	int	An integer that represents the severity of the compliance incident, where a higher value indicates a more severe incident

Compliance Management System:

Property	Data Type	Description
incidents	ComplianceIncidentUnion array	An array of ComplianceIncidentUnion structs, with a maximum capacity of 100 elements. Each element of the array represents an incident of non-compliance within the compliance management system.
numIncidents	int	An integer value that represents the current number of incidents stored in the incidents array. This value can range from 0 to 100.

## Union Used:

Compliance Incident Union:

Name	Data Type	Description
ComplianceIncidentUnion	Union	A union data structure that can hold various types of ComplianceIncident data
ComplianceIncident	Struct	A struct data structure that contains information about a compliance incident
dataPrivacyIncident	Struct of ComplianceIncident	A struct data structure that contains information about a data privacy compliance incident
financialRegulationsIncident	Struct of ComplianceIncident	A struct data structure that contains information about a financial regulations compliance incident
employmentLawsIncident	Struct of ComplianceIncident	A struct data structure that contains information about an employment laws compliance incident
environmentalRegulationsIncident	Struct of ComplianceIncident	A struct data structure that contains information about an environmental regulations compliance incident

## Problem Description:

The following functions will be used for the assignment:

Function Name	Parameter	Return Type	Description
addComplianceIncident	ComplianceManagementSystem *system, ComplianceIncident incident	void	Adds a compliance incident to the management system if it is valid and there is space for it.
calculateAverageSeverity	ComplianceManagementSystem system	float	Calculates the average severity of all compliance incidents in the management system if there are incidents.
removeComplianceIncidentsOfTypes	ComplianceManagementSystem *system, ComplianceType type	int	Removes all compliance incidents of a certain type from the management system and returns the number of incidents removed.

findHighestSeverityIncident	ComplianceManagementSystem system	Compliance Incident	Finds the compliance incident with the highest severity in the management system and returns it. If there are no incidents, a default incident is returned
updateComplianceIncidentSeverity	ComplianceManagementSystem *system, ComplianceIncident incident, int newSeverity	int	Updates the severity of a compliance incident in the management system. Returns 0 if the incident was successfully updated, -1 if the incident was not found, and 1 if the new severity is not within the allowed range of 1-10.
removeComplianceIncident	ComplianceManagementSystem *system, ComplianceIncident incident	void	Removes a compliance incident from the management system. If the incident is not found, it returns without removing anything

#### Test Cases :

Test case name	Input	Output	Explanation
testAddComplianceIncident_ValidIncident	A valid compliance incident with type, description, and severity	The number of incidents in the compliance management system is 1	This test case checks whether a valid compliance incident is added to the system or not.
testAddComplianceIncident_SystemFull	A compliance management system with 100 incidents and a valid compliance incident with type, description, and severity	The number of incidents in the compliance management system is 100	This test case checks whether the system can accommodate more than 100 incidents or not.
testAddComplianceIncident_InvalidType	An invalid compliance incident with type 5, description, and severity	The number of incidents in the compliance management system is 0	This test case checks whether an invalid compliance incident with an invalid type is added to the system or not.

testCalculateAverageSeverity_oneIncident	A compliance management system with one incident with a valid type, description, and severity	The average severity of the incidents is 10.0	This test case checks whether the average severity of a single incident in the system is calculated correctly or not.
testCalculateAverageSeverity_multipleIncidents	ComplianceManagementSystem, multiple incidents	float	This test case is used to calculate the average severity of multiple incidents in a compliance management system.
testCalculateAverageSeverity_SingleIncident	ComplianceManagementSystem, single incident	float	This test case is used to calculate the average severity of a single incident in a compliance management system.
testRemoveComplianceIncidentsOfType_noMatchingType	ComplianceManagementSystem, incident with no matching type	int	This test case is used to check if there are any incidents in a compliance management system with no matching type for removal.
testRemoveComplianceIncidentsOfType1	ComplianceManagementSystem, incident of specified type	int	This test case is used to remove an incident of a specified type from a compliance management system.
testRemoveComplianceIncidentsOfType2	ComplianceManagementSystem, incidents of different types	int	This test case is used to check if there are any incidents in a compliance management system with no matching type for removal when there are multiple incidents of different types.
testFindHighestSeverityIncidentEmpty	A ComplianceManagementSystem	A ComplianceIncident object with	This test case is used to check whether the

	object with 0 incidents	type: DATA_PRIVACY, description: "No incidents in the system", and severity: 0	function findHighestSeverityIncident() can correctly handle an empty system. The expected output is a ComplianceIncident object with the above-mentioned properties.
testFindHighestSeverityIncidentSingle	A ComplianceManagementSystem object with 1 incident of type FINANCIAL_REGULATIONS, description "Data breach in financial system", and severity 8	A ComplianceIncident object with type: FINANCIAL_REGULATIONS, description: "Data breach in financial system", and severity: 8	This test case is used to check whether the function findHighestSeverityIncident() can correctly handle a system with only one incident. The expected output is a ComplianceIncident object with the above-mentioned properties.
testFindHighestSeverityIncidentMultiple	ComplianceManagementSystem object with multiple incidents	ComplianceIncident object with highest severity	This test case checks if the function findHighestSeverityIncident can correctly identify the incident with the highest severity from a system with multiple incidents.
testUpdateComplianceIncidentSeverityValidInput	ComplianceManagementSystem object with a single incident and valid new severity	0	This test case checks if the function updateComplianceIncidentSeverity can update the severity of a compliance incident in the system with a valid new severity and return 0 to indicate success.
testUpdateComplianceIncidentSeverityInvalidSeverity	ComplianceManagementSystem object with a single incident and invalid new severity	1	This test case checks if the function updateComplianceIncidentSeverity can correctly return an error code of 1

			when an invalid new severity is provided for updating the severity of a compliance incident in the system.
testUpdateComplianceIncidentSeverityIncidentNotFound	ComplianceManagementSystem object with no incident matching the input incident	0	This test case checks if the function updateComplianceIncidentSeverity can correctly handle the scenario when the incident to be updated is not found in the system.
testRemoveComplianceIncident_NotFound	A compliance management system with a single incident of type DATA_PRIVACY, severity 1, and description "description1". An incident of type FINANCIAL_REGULATIONS, severity 1, and description "description2".	The number of incidents in the system remains 1.	Since the incident to be removed is not present in the system, the system should remain unchanged.
testRemoveComplianceIncident_Success	A compliance management system with two incidents: one of type DATA_PRIVACY, severity 1, and description "description1", and another of type FINANCIAL_REGULATIONS, severity 2, and description "description2". An incident of type FINANCIAL_REGULATIONS, severity 2, and description "description2".	The number of incidents in the system remains 2, and the first incident in the system is of type DATA_PRIVACY, severity 1, and description "description1".	The incident to be removed is present in the system, so it should be removed and the remaining incidents should stay in the system.

testRemoveComplianceIncident_Empty	An empty ComplianceManagementSystem object and a ComplianceIncidentUnion object with dataPrivacyIncident type, severity, and description.	system.numIncidents should be equal to 0 after calling removeComplianceIncident function.	This test case verifies the behavior of the removeComplianceIncident function when called with an empty ComplianceManagementSystem object and a ComplianceIncidentUnion object with a dataPrivacyIncident type, severity, and description. The expected output is that the number of incidents in the system should remain zero since there are no incidents to remove.
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