Identification of system operations and operation contracts

System operations were identified directly from the messages in the System Sequence Diagrams (SSDs). Each user-to-system interaction represents a system operation. Operation contracts are specified for each critical use case to formally describe preconditions and postconditions.

Use Case	System Operation
Create Task	createTask(title, description, priority, dueDate)
Update Task	updateTask(taskId, …)
Change Task Status	changeTaskStatus(taskId, newStatus)
Create Project	createProject(name, description)
Move Task From Project	moveTask(taskId, projectId)
Remove Task From Project	removeTaskFromProject(taskId)

Task

title

creationDate

dueDate

description

priorityLevel

status

1- Contract CO1: Create Task

Operation:

createTask(title, description, priority, dueDate)

Preconditions:

- Title not empty
- Valid priority
- Valid due date (if provided)

Postconditions (Success):

- New Task object created
- Status set to open
- Creation date set
- ActivityEntry created
- Stored in system

Postconditions (Failure):

- No object created
- System unchanged

2-Contract CO2: Update Task

Operation:

updateTask(taskId, newTitle, newDescription, newPriority, newDueDate)

Preconditions:

- Task exists
- Valid priority (if provided)
- Valid due date (if provided)

Postconditions (Success):

- Task object updated with new values
- ActivityEntry created
- Changes stored in system
- Confirmation returned

Postconditions (Failure):

- No changes made
- System unchanged

3-Contract CO3: Change Task Status

Operation:
changeTaskStatus(taskId, newStatus)

Preconditions:

- Task exists
- newStatus is one of {open, completed, cancelled}

Postconditions (Success):

- Task status updated
- ActivityEntry created
- Changes stored in system
- Confirmation returned

Postconditions (Failure):

- No status change
- System unchanged

4-Contract CO4: Create Project

Operation:
createProject(name, description)

Preconditions:

- Name not empty
- Project name does not already exist

Postconditions (Success):

- New Project object created
- Stored in system
- projectId returned

Postconditions (Failure):

- No project created
- System unchanged

5-Contract CO5: Move Task From Project

Operation:
moveTask(taskId, newProjectId)

Preconditions:
- Task exists
- Project exists

Postconditions (Success):

- Task associated with new project
- Previous project association removed
- ActivityEntry created
- Changes stored in system
- Confirmation returned

Postconditions (Failure):

- No project change
- System unchanged

6-Contract CO6: Remove Task From Project

Operation:
removeTaskFromProject(taskId)

Preconditions:

- Task exists
- Task currently assigned to a project

Postconditions (Success):

- Task project reference set to null
- ActivityEntry created
- Changes stored in system
- Confirmation returned

Postconditions (Failure):

- No changes made
- System unchanged