

### **Contract CO1: Create Task**

**Operation:** createTask(title, description, priority, dueDate)

**Cross References:** Use Cases: Create Task, Record Activity.

**Preconditions:**

- A TaskCatalog exists and is associated with the SystemController.

**Postconditions:**

- A Task instance t was created.
  - t.taskId, t.title, t.description, t.priority, and t.dueDate were initialized from the parameters.
  - t.status was initialized to open.
  - t.creationDate was set to the current system date.
  - t was added to the TaskCatalog.
  - t was associated with no Project initially.
  - An ActivityEntry instance ae was created with a description detailing the change.
  - ae was associated with t and added to the ActivityLog
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### **Contract CO2: Create Project**

**Operation:** createProject(name, description)

**Cross References:** Use Cases: Manage Projects.

**Preconditions:**

- A ProjectCatalog exists and is associated with the SystemController.

**Postconditions:**

- A Project instance p was created.
  - p.projectId, p.name, and p.description were initialized from the parameters.
  - p was added to the ProjectCatalog.
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### **Contract CO3: Update Task Status**

**Operation:** updateTaskStatus(taskId, newStatus)

**Cross References:** Use Cases: Track Task Status, Record Activity.

**Preconditions:**

- A Task instance t with the provided taskId exists in the TaskCatalog.
- newStatus is a valid member of the Status enumeration (open, completed, or cancelled).

**Postconditions:**

- t.status was modified to newStatus.
  - The previous status was replaced by newStatus.
  - An ActivityEntry instance ae was created with a description detailing the change.
  - ae was associated with t and added to the ActivityLog.
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### **Contract CO4: Assign Task to Project**

**Operation:** assignTaskToProject(taskId, projectId)

**Cross References:** Use Cases: Organize Tasks into Projects.

**Preconditions:**

- A Task instance t with the provided taskId exists in the TaskCatalog.
- A Project instance p with the provided projectId exists in the ProjectCatalog.

**Postconditions:**

- An aggregation association was formed between p and t.
  - Any existing project association for t was removed (satisfying the "at most one project" constraint).
  - An ActivityEntry instance ae was created with a description detailing the change.
  - ae was associated with t and added to the ActivityLog.
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### **Contract CO5: Remove Task From Project**

**Operation:** removeTaskFromProject(taskId)

**Cross References:** Use Cases: Organize Tasks into Projects.

**Preconditions:**

- A Task instance t with the provided taskId exists.
- t is currently associated with a Project.

**Postconditions:**

- The aggregation association between t and its Project was broken.
  - An ActivityEntry instance ae was created with a description detailing the change.
  - ae was associated with t and added to the ActivityLog.
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### **Contract CO6: Create Subtask**

**Operation:** createSubtask(parentTaskId, title)

**Cross References:** Use Cases: Manage Subtasks.

**Preconditions:**

- A parent Task instance t with the provided parentTaskId exists in the TaskCatalog.

**Postconditions:**

- A Subtask instance st was created.
  - st.title was initialized from the parameter and st.status was set to open.
  - st was added to the subtasks collection of t (composition association).
  - An ActivityEntry instance ae was created with a description detailing the change.
  - ae was associated with t and added to the ActivityLog
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### **Contract CO7: Add Tag to Task**

**Operation:** addTagToTask(taskId, tagKeyword)

**Cross References:** Use Cases: Manage Tags.

**Preconditions:**

- A Task instance t with the provided taskId exists.

**Postconditions:**

- A Tag instance tg with the provided tagKeyword was identified (or created if it did not already exist).
  - An association was formed between t and tg.
  - An ActivityEntry instance ae was created with a description detailing the change.
  - ae was associated with t and added to the ActivityLog
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### **Contract CO8: Search Tasks**

**Operation:** searchTasks(keyword)

**Cross References:** Use Cases: Search Tasks.

**Preconditions:** None.

**Postconditions:**

- The system identified all Task instances in the TaskCatalog where title or description contained keyword.
  - The list of matching tasks was returned to the user.
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### **Contract CO9: View Tasks**

**Operation:** viewTasks(criteria)

**Cross References:** Use Cases: View Tasks.

**Preconditions:**

- criteria represents a valid filter (e.g., specific date, priority, or project ID).

**Postconditions:**

- The system filtered the TaskCatalog based on the specified criteria.
- The resulting collection of Task instances was returned to the user.

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**Contract CO10: View Task History**

**Operation:** viewTaskHistory(taskId)

**Cross References:** Use Cases: View Activity History.

**Preconditions:**

- A Task instance t with the provided taskId exists.

**Postconditions:**

- All ActivityEntry instances associated with t were retrieved from the ActivityLog.
- The entries were returned to the user in chronological order.

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**Contract CO11: Create Activity Entry**

**Operation:** createActivityEntry(taskId, description)

**Cross References:** All critical use cases involving updates or creation.

**Preconditions:**

- A Task instance t with the provided taskId exists.

**Postconditions:**

- An ActivityEntry instance ae was created.
- ae.timestamp was set to the current system time and ae.description was initialized.
- ae was added to the global ActivityLog.
- ae was associated with t.