This is the metamodel of the Unified Modeling Language (UML). It describes the constituents of all well-formed models that may be represented in the UML, using the UML itself. See http://www.rational.com/uml for updates.

The metamodel is organized according to the following packages:

- **Foundation**
  - Core
  - Auxiliary Elements
  - Extension Mechanisms
  - Data Types
- **Behavioral Elements**
  - Common Behavior
  - Collaborations
  - Use Cases
  - State Machines
- **Model Management**
Top-Level Packages

- Behavioral Elements
- Model Management
- Foundation
Standard Elements

Stereotypes, tagged values, and constraints are the mechanisms of extensibility in the UML. Stereotypes extend the classes in the metamodel, tagged values extend the attributes of classes in the metamodel, and constraints extend the semantics of the metamodel. Certain stereotypes, tagged values, and constraints are predefined in the UML; others may be user defined.

<table>
<thead>
<tr>
<th>Standard stereotypes</th>
<th>Standard tagged values</th>
<th>Standard constraints</th>
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<tbody>
<tr>
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State Machines: Main

- **ModelElement**: (from Core)
  - context: 0..1
- **StateMachine**
  - behavior: *
  - deferredEvent: 0..*
  - transitions: *
- **State**:
  - exit: 0..1
  - entry: 0..1
  - internalTransition: *
- **Transition**:
  - outgoing: *
  - incoming: *
  - source: 1
  - target: 1
- **StateVertex**
  - substate: 1..*
  - top: 0..1
- **Pseudostate**: kind: PseuostateKind
- **CompositeState**: isConcurent: Boolean
- **SimpleState**
- **SubmachineState**
  - submachine: 1
- **Guard**
  - expression: BooleanExpression
  - guard: 0..1
- **Action**
  - action: 0..1
- **ActionSequence**
- **Event**
  - trigger: 0..1
State Machines:
Activity Models
State Machines:
Events

```
Event

SignalEvent
  occurrence: *
  Signal
    (from Common Behavior)

CallEvent
  occurrence: *
  Operation
    (from Core)

TimeEvent
  duration: TimeExpression

ChangeEvent
  changeExpression: BooleanExpression
```
Auxiliary Elements: Dependencies

- **Dependency**
  - description : String
  - requirement
  - subDependency
    - *

- **ModelElement**
  - (from Core)
  - client
    - *
  - template
    - 0..1
  - templateParameter
    - *

- **Refinement**
  - mapping : Mapping

- **Usage**

- **Trace**

- **Binding**
  - argument
    - 1..* (ordered)
  - ModelElement
    - (from Core)
Auxiliary Elements:
Physical Structures and View Elements
Foundation Packages

Auxiliary Elements

Core

Extension Mechanisms

Data Types
Extension Mechanisms

- **GeneralizableElement** (from Core)
  - stereotype
  - stereotypeConstraint
  - constrainedStereotype

- **ModelElement** (from Core)
  - extendedElement
  - taggedValue
  - stereotypeConstraint
  - constrainedElement

- **TaggedValue**
  - tag : Name
  - value : Uninterpreted

- **Constraint** (from Core)
  - constraint

- **Stereotype**
  - icon : Geometry
  - baseClass : Name
Common Behavior: Instances and Links

- ModelElement (from Core)
  - Link
    - LinkEnd
      - instance
      - linkEnd
      - linkRole
      - associationEnd
      - association
      - connection
    - Object
      - DataValue
      - Classifier (from Core)
      - Attribute (from Core)
    - LinkObject
      - Link
      - Request
        - argument
        - specification
      - MessageInstance
        - receiver
        - sender
      - Instance
        - attribute
        - classifier
        - slot
        - value

Common Behavior: Requests

MODEL

- **GeneralizableElement**
  - **Parameter**
    - parameter: 0..1
    - {ordered}
  - signal: 0..1
- **ModelElement**
- **Request**
- **Signal**
  - reception: 0..*
  - parameter: 0..* {ordered}
  - raisedException: * context: *
  - exception: 0..*
- **Exception**
  - raiseException: *
- **BehavioralFeature**
- **Operation**
  - isPolymorphic: Boolean
  - specification: Uninterpreted
Core: Relationships

- ModelElement
  - name : Name

- ModelElement
  - supplier
  - client

- Generalization
  - discriminator : Name
  - generalization
    - subtype 1
    - specialization
      - supertype 1

- GeneralizableElement
  - isRoot : Boolean
  - isLeaf : Boolean
  - isAbstract : Boolean

- Dependency
  - description : String

- Classifier
  - type
    - 1
    - *
    - *
  - associationEnd
    - *

- Class

- Association
  - 2..* {ordered}
  - 1
  - connection

- AssociationEnd
  - isNavigable : Boolean
  - isOrdered : Boolean
  - aggregation : AggregationKind
  - multiplicity : Multiplicity
  - changeable : ChangeableKind
  - targetScope : ScopeKind

- Attribute
  - qualifier
    - *
      - {ordered}

- AssociationClass
Behavioral Elements Packages

- Collaborations
- Use Cases
- State Machines
- Common Behavior
Use Cases

**Classifier** (from Core)

- specification
- realization

**Actor**

**UseCase**

- extensionPoint : list of String

**Instance** (from Common Behavior)

**UseCaseInstance**