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TTCN-3 Language Extensions: Object-Oriented Features

**ETSI Standard**

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650 Route des Lucioles

F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C

Association à but non lucratif enregistrée à la

Sous-Préfecture de Grasse (06) N° 7803/88

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#### 5.1.2.6 Object Templates

***Syntactical Structure***

"{" { ( *FieldName* | *FunctionInstance* ) ":=" *TemplateBody* [","] } "}"

***Semantic Description***

An object template is a matching mechanism to be used for objects similar to those used for record values. It can be used as a *TemplateBody* in template declarations for templates of class type and everywhere else where a *TemplateBody* is acceptable except in sending and receiving operations as objects can neither be sent nor received.

If an object template is used in a matching operation to match against an object reference, it matches if and only if for all assignments in the compound assignment notation the matching mechanism on the right hand side of the assignment matches the value yielded by the evaluation of applying the left hand side of the assignment as dotted notation to the object.

NOTE1: It is not necessary to add an assignment in the template for *all* public properties that exist in the class. For all public properties that are not assigned any matching mechanism in the template, a “don’t care” semantics is assumed. This is especially useful for using templates for objects of subclasses that might have additional properties.

Object templates declared for a class can also be used to match against objects of all subclasses.

The modifies operation is allowed also for Object templates with the same procedure as for record templates, but only *FieldName* assignments are modified while *FunctionInstance* assignments are not modified, though additional FunctionInstance assignments may be added.

It is allowed to have multiple *FunctionInstance* assignments of the same method in the same object template, possibly with different actual parameters.

NOTE2: Usage of *FunctionInstance* assignments can lead to contradictory assignments that would lead to the object template not matching any object of the class.

***Restrictions***

1. The *FieldName* in an assignment in the template shall be the name of a public value property of the template’s class. The type of the property shall be compatible with the corresponding *TemplateBody* on the right hand side.
2. The name of the function in the *FunctionInstance* in an assignment in the template shall be the name of a public method of the template’s class. The actual parameter lists given in the *FunctionInstance* shall be compatible with the formal parameter lists of that method and the return type of the function shall be a value type compatible with the corresponding *TemplateBody* on the right hand side.
3. The getter of a public property or the function used on the left hand side of an assignment in an object template shall be deterministic and shall fulfill the restrictions imposed on content of functions used in special places given in clause 16.1.4.
4. The names in *FieldName* assignments in an object template shall be unique, i.e no *FieldName* shall appear more than once on the left hand side.
5. Object templates shall not be used in sending or receiving operations.
6. Object template shall not be used as values and can not be converted to a value with the **valueof** operation.

***Examples***

EXAMPLE1:

**type class** Pair { **public var integer @property** a, **@property** b }

**template** Pair t := { a := (1 .. 20) }

**type class** Triple **extends** Pair { **public var integer @property** c }

**match**(Triple.**create**(1,2,3), t) // returns true

EXAMPLE2:

**type** **class** @**abstract** Shape { **public** **function** @**abstract** area() return float; }

// smallShape would match for all objects whose class is derived from Shape

// and where the result of the method call to area() fulfills the constraint.
**template** Shape smallShape := { area() := (0.0 .. 20.0) }

// contradictory template:

**template** Shape empty := {
  area() := (0.0 .. **infinity**),
  area() := {-**infinity** .. !0.0)
}

BNF Rules to be changed:

TemplateBody ::= … | ObjectTemplate

New BNF Rules to be added:

ObjectTemplate ::= "{" ObjectTemplateField { "," ObjectTemplateField } "}"

ObjectTemplateField ::= ( *Identifier* | *FunctionInstance* ) ":=" *TemplateBody*