

## Class 33: Diving Deep(er) Into The Charme Evaluator

The if statement matches the input expression with the corresponding expression type or definition:

### Python:

```
def meval(expr, env):
    if isPrimitive(expr):           return evalPrimitive(expr)
    elif isIf(expr):                return evalIf(expr, env)
    elif isDefinition(expr):        evalDefinition(expr, env)
    elif isName(expr):              return evalName(expr, env)
    elif isLambda(expr):            return evalLambda(expr, env)
    elif isApplication(expr):        return evalApplication(expr, env)
    else:                            error ('Unknown expression type:' + str(expr))
```

### Java:

```
public static Object meval(Object expr, Environment env) throws EvalError {
    Object returnval;

    if (isPrimitive(expr)) { returnval = evalPrimitive(expr); }
    else if (isIf(expr)) { returnval = evalIf(expr, env); }
    else if (isCond(expr)) { returnval = evalCond(expr, env); }
    else if (isDefinition(expr)) { evalDefinition(expr, env); returnval = ""; }
    else if (isName(expr)) { returnval = evalName(expr, env); }
    else if (isLambda(expr)) { returnval = evalLambda(expr, env); }
    else if (isApplication(expr)) { returnval = evalApplication(expr, env); }
    else { throw new EvalError("Unknown expression type: " + expr.toString()); }
    return returnval;
}
```

### isName:

#### Python

```
def isName(expr):
    return isinstance(expr, str)
```

#### Java

```
public static boolean isName(Object expr){
    return (expr instanceof String);
}
```

### Lookup Rules:

1. First, we search the current environment's frame for a place with a name that matches the name in the expression. If we have a match, the value in that place is the value of the expression
2. Else we evaluate the name expression in the parent environment.
3. If the current evaluation environment has no parent, the name is not defined and the expression evaluates to an error.

```

def lookupVariable(self, name):
    if self._frame.has_key(_____):
        return _____
    elif (self._parent):
        return _____
    else:
        evalError('Undefined name: %s' % (name))

```

## Java

```

public Object lookupVariable(String name) throws EvalError {
    if (frame.containsKey(name)) {
        return frame.get(name);
    }
    else if (parent != null) {
        return parent.lookupVariable(name);
    }
    else {
        throw new EvalError("Undefined name "+name);
    }
}

```

```

def evalDefinition(expr, env):
    assert isDefinition(expr)
    if len(expr) != 3:
        evalError ('Bad definition: %s' % str(expr))
    name = _____
    if isinstance(name, str):
        value = meval(_____, env)
        env.addVariable(_____, _____)
    else:
        evalError ('Bad definition: %s' % str(expr))

```

```

def evalIf(expr,env):
    assert isIf(expr)
    if len(expr) != 4:
        evalError ('Bad if expression: %s' % str(expr))
    if meval(_____, env) != False:
        return meval(_____,env)
    else:
        return meval(_____,env)

```

```

def primitivePlus (operands):
    if (len(operands) == 0):
        return _____
    else:
        return _____ + primitivePlus (operands[1:])

```