**Algorithmic Thinking**

**DEFN (revisited)**

An algorithm is a group of instructions (often expressed informally) for performing some task.

**examples of algorithms**
- recipe for baking cookies
- a set of travel directions
- directions for operating your cell phone
- procedures for registering for next semester’s classes
- instructions for completing an income tax form
- a computer program

---

**Activity Diagrams**

**the purpose**
- a notation for depicting ____________
- captures the ______ of an algorithm
- activity diagrams are a kind of flow diagram / flowchart
- part of the Unified Modeling Language (UML)

**the notation**

- an action to be performed
- a flow that determines the order of actions
- a point at which flows merge or split (a choice)
Simple Activity Diagram

Instructions for setting wristwatch time

- Pull crown out to 2nd position
- Turn crown counterclockwise to desired time
- Push crown in to normal position

Making Choices in Algorithms

the pattern

from some previous part of the diagram

Condition 1

Choice #1

Condition 2

Choice #2

... Condition N

Choice #N
Login Algorithm

Repetition in Algorithms

the patterns
**Fudge Algorithm**

Combine in a saucepan:
- unsweetened chocolate (4 oz.)
- sugar (2 c.)
- milk (1/2 c.)
- light cream (1/2 c.)
- corn syrup (1 T.)
- salt (1/2 t.)

- cook over medium heat
- drizzle about 1/4 t. in cold water
  - [drizzle won't form]
  - [drizzle can be formed into soft ball]
- remove from heat
- stir in butter (1 T.), vanilla (1 T.) and walnuts (1 c.)
- press into greased pan

**Login Algorithm 2**

System displays login panel

User login

<table>
<thead>
<tr>
<th>User Name</th>
<th>Password</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Cancel</td>
<td>login</td>
</tr>
</tbody>
</table>

[Cancel is clicked] [login is clicked]

cancel login

user enters name

user enters password

System checks user/password

[display login message] [display popup error window]