CS620c Structured Programming
Lesson 9

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Quick Revision

- Let's look at an example of a selection statement – then I'm going to get you to do an exercise

Quick Recap

- Let's begin with a quick recap

- Write an algorithm and a program to check if any given whole number is a multiple of 5. The program should print an appropriate message.

  You have 5 minutes

Boolean Operators

- **Operator**   **Result**
  -     &   Logical AND
  -     | Logical OR
  -     ^   Logical XOR

Operator	Result
||	Short-circuit OR
&&	Short-circuit AND
!	Logical NOT

Short-circuit AND and logical AND

- Short-circuit AND, &&, only checks the second condition if the first is true.
  - If the first is false there is no point evaluating the second as "AND" anything with false is always false.
  - The logical AND, &, always evaluates both expressions and then ANDs them together. Normally you use && it is faster than &; logically they are the same.

- Short-circuit OR,||, only checks the second condition if the first is false.
  - If the first is true there is no point evaluating the second as "OR" with true is always true.

&& Example

```
int a=5, b=10, c=6, d=3;


if ( (a>b) && (c>d) )
{
 System.out.println("True");
}
else
{
 System.out.println("False");
}
```

Loops (Iteration)

- Loops allow your program to do the same thing again and again and again and again.

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- There are 3 looping statements in JAVA:-
  - while
  - for
  - do…while
- A loop repeatedly executes the same set of instructions until a finishing condition is met

Why use loops?

- **To automate the repetition of calculations**. We wish to repeat the calculation once for each one of a number of items of data..

- **To iterate through data and test for certain condition.** For example, we may read numbers from a keyboard, analyse each one and perform some action on it, until a particular value is typed.

- **To keep attempting some operation** (such as obtaining data from a remote computer over a network) until either we succeed (all is well, we have obtained the data, so we proceed to use that data), or until a specified number of attempts have failed. (In this case the whole process must be abandoned.)

While loops

- While loops appear quite similar to if statements, as they also use boolean conditions.
- Initialisation; // control variables etc

  while(condition)

  {

      statement1;

      statement2;

  ….

      update;

   }

- The difference is that as long as the condition being tested is true, whatever is between the braces will execute again and again, possibly forever!

Example

```
int count = 1; // start count at one
while ( count <= 3 )  // loop while count is <= 3
{
    System.out.println("Count is:" + count );
    count = count + 1; // add one to count
}
```

- Let's walk through some examples on asethates

Summary

- After today's lecture you should understand the following:
    - Boolean operators
    - Operator Precedence
    - Basic loops