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## do/while Selection Structure

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## Last Time

- We
  - Completed our discussion on `for` loops
  - Learnt about the `switch` selection structure
- Today we will
  - Continue talking about switch statements
  - Learn about ASCII values
  - Learn about `cin.get()`
  - Introduce the `do/while` repetition structure

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## Example

```
int grade; // one grade
int aCount = 0; // number of As
int bCount = 0; // number of Bs
int cCount = 0; // number of Cs
int dCount = 0; // number of Ds
int fCount = 0; // number of Fs

cout << "Enter the letter grades." << endl
    << "Enter the EOF character to end input."
    << endl;

// loop until user types end-of-file key sequence
while ( ( grade = cin.get() ) != EOF ) {
```

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## Example

```
switch ( grade ) { // switch structure
    case 'A': // grade was uppercase A
    case 'a': // or lowercase a
        ++aCount; // increment aCount
        break; // necessary to exit switch
    case 'B': // grade was uppercase B
    case 'b': // or lowercase b
        ++bCount; // increment bCount
        break; // exit switch
    case 'C': // grade was uppercase C
    case 'c': // or lowercase c
        ++cCount; // increment cCount
        break; // exit switch
    case 'D': // grade was uppercase D
    case 'd': // or lowercase d
        ++dCount; // increment dCount
        break; // exit switch
```

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## Example

```
case 'F': // grade was uppercase F
    case 'f': // or lowercase f
        ++fCount; // increment fCount
        break; // exit switch
    case '\n': // ignore newlines,
    case '\t': // tabs,
    case ' ': // and spaces in input
        break; // exit switch
    default: // catch all other characters
        cout << "Incorrect letter grade entered."
            << " Enter a new grade." << endl;
        break; // optional
} // end switch
} // end while
```

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## cin.get()

- Used to read one character from the keyboard at a time
- Also reads new lines, spaces, and tabs as a character
  - `\n`: new line
  - `\t`: tab
  - `' '`: space

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## ASCII Values

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- All characters have integer values called ASCII values
  - 'a': 97
  - 'b': 98
  - 'z': 122
  - 'A': 65
  - 'B': 66
  - 'Z': 90

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## ASCII

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- ASCII: American Standard Code for Information Interchange
- Appendix B lists the ASCII character set

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## EOF

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- An integer constant defined in the iostream library
- On Unix it is:
  - <ctrl-d>
- On Windows it is:
  - <ctrl-z>

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## do/while Repetition Structure

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- What repetition structures have we covered so far?
- **do/while** is another repetition structure
- Useful when the test happens at the end of the loop

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## do/while Loops

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```
do
{
    cout << "Enter a year:" << endl;
    cin >> year;
} while (year < 0);
```

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## When to use do while?

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- When loop must execute at least once
- Perfect for data validation!
- Post-tested loop
- General format:

```
do
{
    statements;
} while (condition is true);
```

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## Example

- Write a program segment that takes as input a number between 5 and 10. Error proof the segment

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## What's the output?

```
m = 10;
do
{
    cout << m << endl;
    m = m - 3;
} while (m > 0);
```

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## Rewrite

```
num = 10;
while (num <= 100)
{
    cout << num << endl;
    num += 10;
}
```

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## Rewrite

```
for (n = 3; n > 0; n--)
    cout << n << " squared is"
        << n*n << endl;
```

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## What is the Output?

```
♦ int counter = 1;
do
{
    cout << counter << " ";
} while( ++counter <= 10 );
```

```
♦ int counter = 1;
do
{
    cout << counter << " ";
} while( counter++ <= 10 );
```

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## What is the Purpose?

```
char ch;
do
{
    cout << "Enter a valid code (h,c,i): ";
    cin >> ch;
} while ((ch != 'h') && (ch != 'c') && (ch != 'i'));
```

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## Rewrite as a `for` and `while` Loop

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```
int i;  
for(i = 0; i <= 50; i++)  
    sum += i;
```

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## Summary

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- In today's lecture we covered
  - Continue talking about switch statements
  - Learn about ASCII values
  - Learn about `cin.get()`
  - Introduce the `do/while` repetition structure
- Readings
  - P. 113 - 119 `switch` selection structure
  - P. 120 - 121 `do/while` repetition structure

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