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## do/while Selection Structure

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## Last Time

- We
  - Learnt about the `switch` selection structure
  - Learn about ASCII values
  - Learn about `cin.get()`
- Today we will
  - Introduce the `do/while` repetition structure

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## do/while Repetition Structure

- 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

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

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## When to use do while?

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

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

---

## Example

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

## What's the output?

- 14.2

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

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## Rewrite

- 14.3

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

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## Rewrite

- 14.4

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

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## What is the Output?

- 14.5

```
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?

- 14.6

```
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 do-while Loop

- 14.7

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

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## Nested Loops

- A loop within a loop
- Can repeat multiple things within a loop
- Example: Read in 10 grades for each of 20 students
  - How would we write loops to do this?

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## What is the Output?

```
• 14.8
for (int i = 0; i < n; i++)
{
    for (int j = 0; j < i; j++)
        cout << "*" ;
    cout << endl;
}
```

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## What is the Output?

```
• 14.9
for (int i = m; i > 0; i--)
{
    for (int j = n; j > 0; j--)
        cout << "*" ;
    cout << endl;
}
```

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## 14.10 What is the Output?

```
cout << setw(4) << "|";
for( int head = 0; head <= 10; head++ )
    cout << setw(3) << head;
cout << endl;

for( int i=0; i< 3*12+1; i++ )
    cout << "-";
cout << endl;

for( int row = 0; row <= 10; row ++ )
{
    cout << setw(3) << row << "|";
    for( int col = 0; col <= 10; col++ )
        cout << setw(3) << row * col;
    cout << endl;
}
```

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## Summary

- In today's lecture we covered
  - Introduce the `do/while` repetition structure
- Readings
  - P. 120 - 121 `do/while` repetition structure

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