Programming Fundamentals

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Type Conversion (Casting)

- Implicit type coercion: when value of one type is automatically changed to another type
- Cast operator provides explicit type conversion
- Use the following form:
  - `static_cast<dataTypeName>(expression)`

Type Casting

- `static_cast<int>(7.9)`
- `static_cast<int>(3.3)`

Type Casting

- `static_cast<double>(25)`
- `static_cast<double>(5 + 3)`
- `static_cast<double>(15) / 2`
- `static_cast<double>(15 / 2)`

Type Casting

- `static_cast<int>(7.8 + static_cast<double>(15) / 2)`
- `static_cast<int>(7.8 + static_cast<double>(15 / 2))`

EXAMPLE 2-9

Expression	Evaluates to
`static_cast<int>(7.9)`	7
`static_cast<int>(3.3)`	3
`static_cast<double>(25)`	25.0
`static_cast<double>(5+3)`	=`static_cast<double>(8)`=8.0
`static_cast<double>(15)/2`	=15.0/2 (because `static_cast<double>(15)`=15.0) =15.0/2.0=7.5
`static_cast<double>(15/2)`	=`static_cast<double>(7)` (because 15/2=7) = 7.0
`static_cast<int>(7.8 +` `static_cast<double>(15)/2)`	=`static_cast<int>(7.8+7.5)` =`static_cast<int>(15.3)` = 15
`static_cast<int>(7.8 +` `static_cast<double>(15/2))`	=`static_cast<int>(7.8 + 7.0)` =`static_cast<int>(14.8)` = 14

Using namespace std

- std :: cout
- std :: cin
- std :: endl

Repetition

- Print first 5 natural numbers

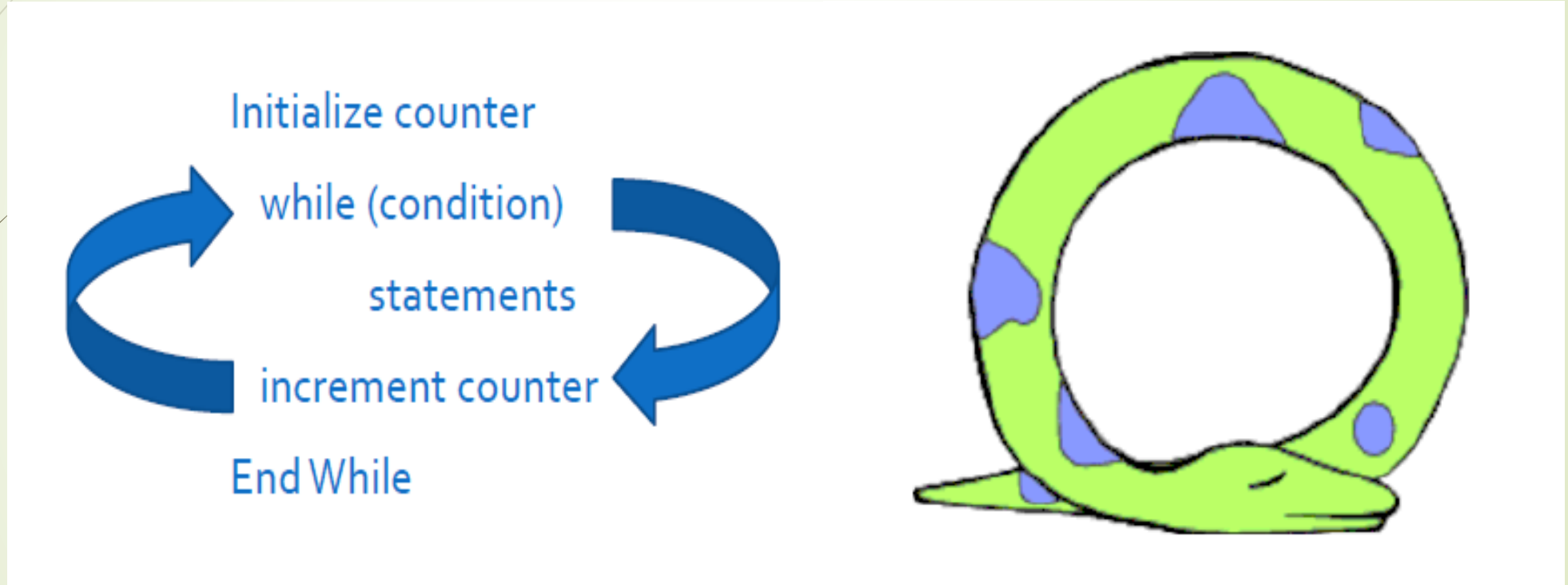
Repetition

- Print first 15 natural numbers

Repetition

- Print first 1000 natural numbers

Loop


Initialize counter
while (condition)
statements
increment counter
End While

Print 1-1000 Natural Numbers

- Start
- Set counter = 1
- Set number = 1
- while(counter <= 1000)
  - Output number
  - increment number
  - increment counter
- end while
- Stop

Print 1-1000 Natural Numbers

- Start
- Set counter = 1
- while(counter <= 1000)
  - Output counter
  - increment counter
- end while
- Stop

Exercise 1

```
Count  = 1
While (Count < 5)
    output Count
    Count =  Count + 1
End While
```

Exercise 2

```
Count = 1
While ( Count < 5)
    Output " * "
    Count = Count  + 1
End While
```

Exercise 3

Count = 1

```
While (Count < 5)
      output Count
      Count =  Count + 1
End While
```

Count = 1

```
While ( Count < 5)
      Output " * "
      Count = Count  + 1
End While
```

Exercise 4

```
Count = 1
Z = 1
While (Count < 10)
        If Count  == 3
              Z = 2
        End if
        Output Count “  “
        Output Z
        Output Newline
        Count =  Count + 2
End While
```

Exercise 5

```
Input Variable: X
Count = 1
Z = 1

While (Count < 3)
        Input X
        If X is greater than 5
                Z = 2
        Else
                Z = 4
        End if
        Count =  Count + 1
End While

Output Z
```

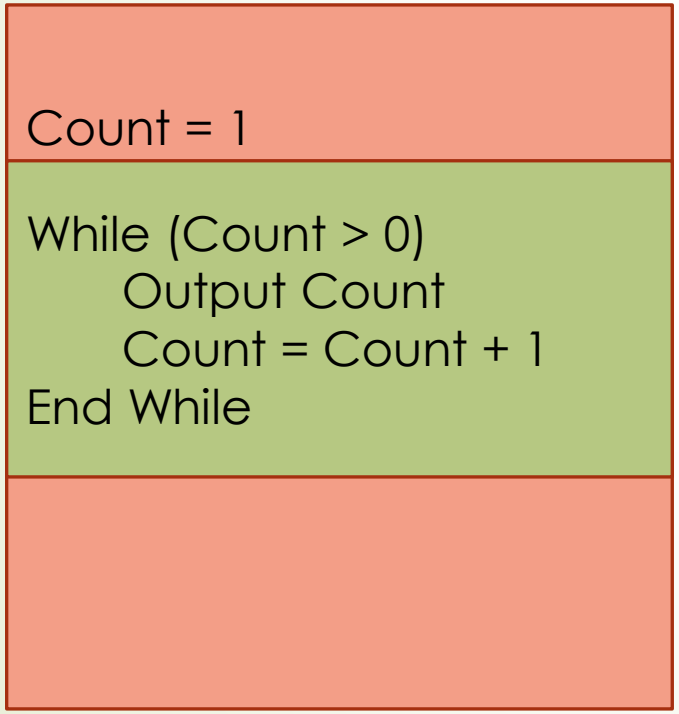
What is output of above program if input is

10 5

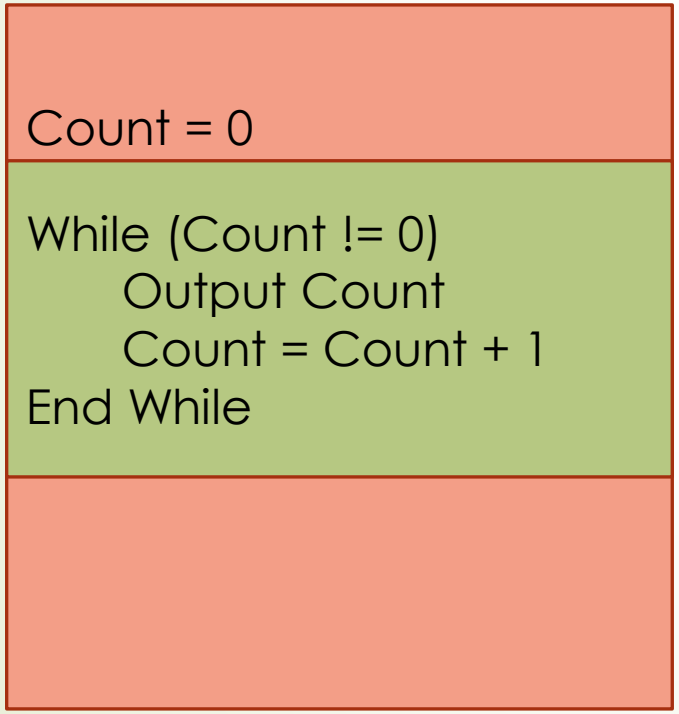
Exercise 6

```
Sum = 0
Count = 1

While (Count < 5)
        Sum = Sum + Count
        Count = Count + 1
End While

Output Sum
```

Exercise 7



Exercise 8



Exercise 9

```
Count = 1

While (Count < 5)
        Output " * "
        Count = Count + 1
            If (Count == 4 )
                Output New line
                Count = 1
            End if

End While
```

Practice

- Write code to calculate factorial of a number
- Write code to calculate power of any number
- Write code to print table of any number till 10

```
Set Number1 = 1
Set Number2 = 2
Set Number3 = 3
Set value of Sum = Number1+Number2+Number3
while (sum <= 39)
begin while loop
    Number1 = Number2
    Number2 = Number3
    Number3 = Sum
    Sum = Number1+Number2+Number3
    output "*"
end of while loop
output "Number1 is :", output Number1
output "Number2 is:", output Number2
output "Number3 is:", output Number3
output "Sum is:", output Sum
```

```
START
Number1 = 1
Number2 = 30
Sum = 0
while (Number2 >= Number1)
begin while loop
    Number1 = Number1 + 1
    Number2 = Number2 –2
    Sum = Number1 + Number2
end while loop
output “Number1 is :”, output Number1
output “Number2 is:”, output Number2
output “Sum is”, output Sum
END
```

Exercise

- Write pseudocode for a program which reads 10 integers from the user, and output the largest value input.

Exercise

- Write pseudocode for a program that prints the numbers from 1 to 100. But for multiples of three print “Fizz” instead of the number and for the multiples of five print “Buzz”. For numbers which are multiples of both three and five print “FizzBuzz”.

References

1. C++ Programming: From Problem Analysis to Program Design, Third Edition
2. https://www.just.edu.jo/~yahya-t/cs115/