



NAMIBIA UNIVERSITY  
OF SCIENCE AND TECHNOLOGY

**Faculty of Computing and Informatics**

# Selection Control Structure

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2020 Semester I

Introduction to Computing  
(ITC511S)





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# 1. Structure Theorem

It states that it is possible to solve any software problem using only 3 control structures:

1. Sequential;
2. Selection;
3. Repetition



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## 2. Sequential

Start

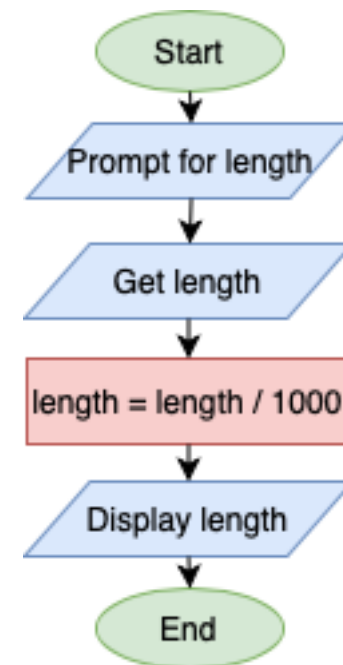
Prompt for length in metres

Get length

$\text{length} = \text{length} / 1000$

display length in kilometres

End



With sequential control structure, statements are executed one after another in the order they appear.



### 3. Selection

Start

Read withdrawalAmount

If (withdrawalAmount < balance) Then

    balance = balance – withdrawalAmount

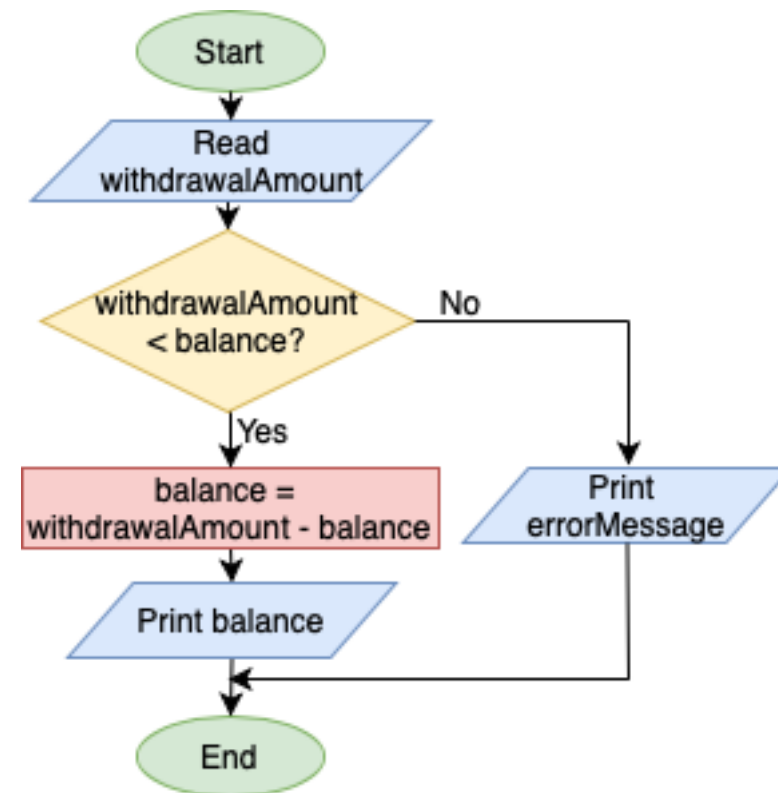
    Print balance

else

    Print errorMessage

Endif

End





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## 4. Repetition



Relax! We'll discuss repetition control structure next week!



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## 5. Relational Operators Revisited

Operator	Meaning	Example
>	greater than	balance > withdrawalAmount
<	less than	weight < 76.84
>=	greater or equal to	counter >= 8
<=	less or equal to	salesTax <= 16.3
==	equal to	symbol == 'A'
< > or !=	not equal to	hoursWorked != 8

Note that all relational expressions to a true or false.



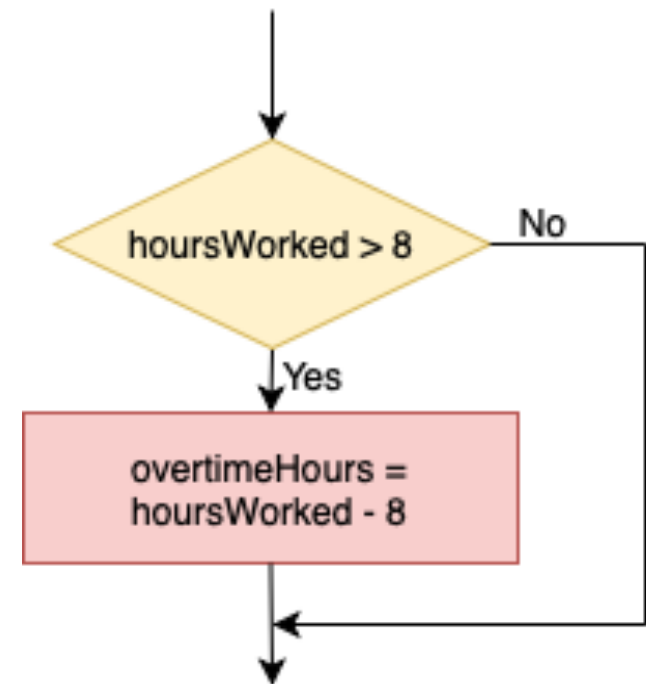
## 6. if ... then statement

Structure:

```
if (condition) then  
    statement  
endif
```

Example:

```
if (hoursWorked > 8) then  
    overtimeHours = hoursWorked - 8  
endif
```







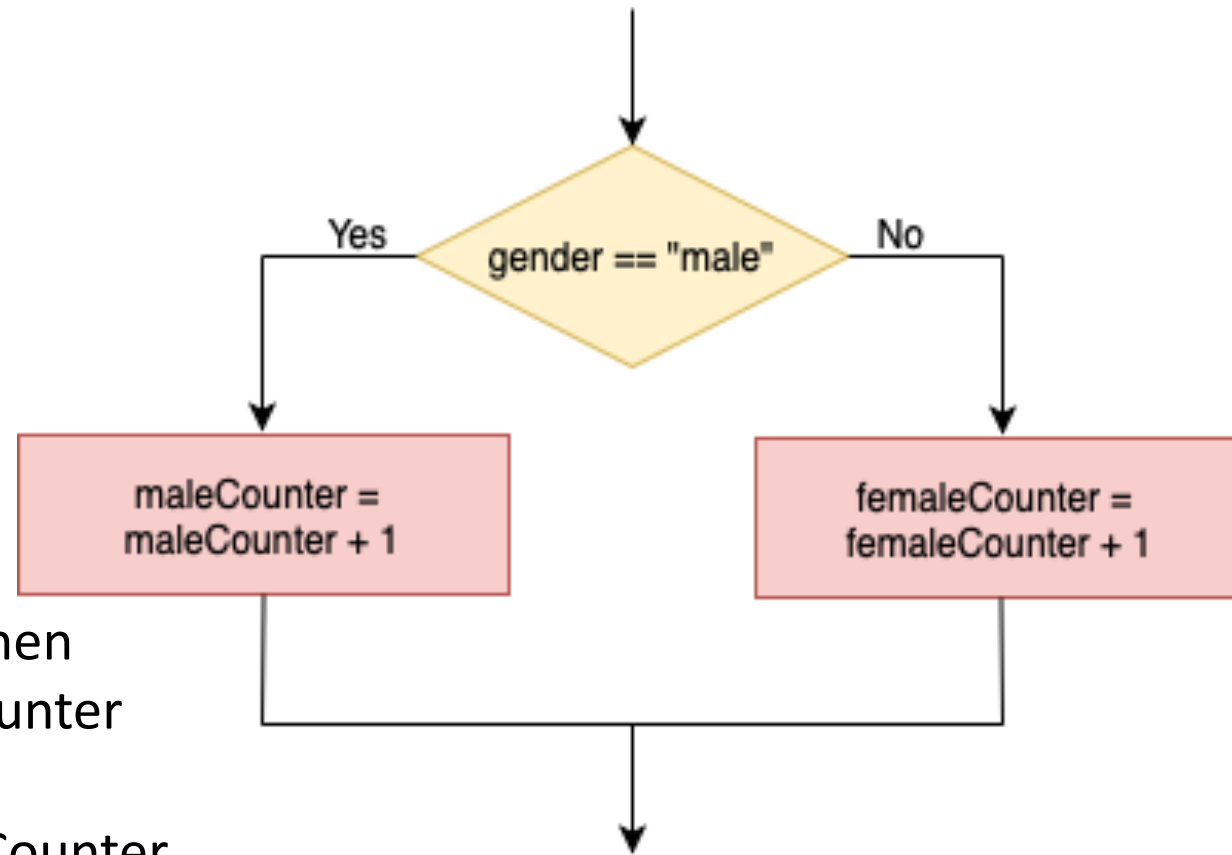
## 7. if-else statement

Structure:

```
if (condition) then  
    statement1  
else  
    statement2  
endif
```

Example:

```
if (gender == "male") then  
    increment maleCounter  
else  
    increment femaleCounter  
endif
```





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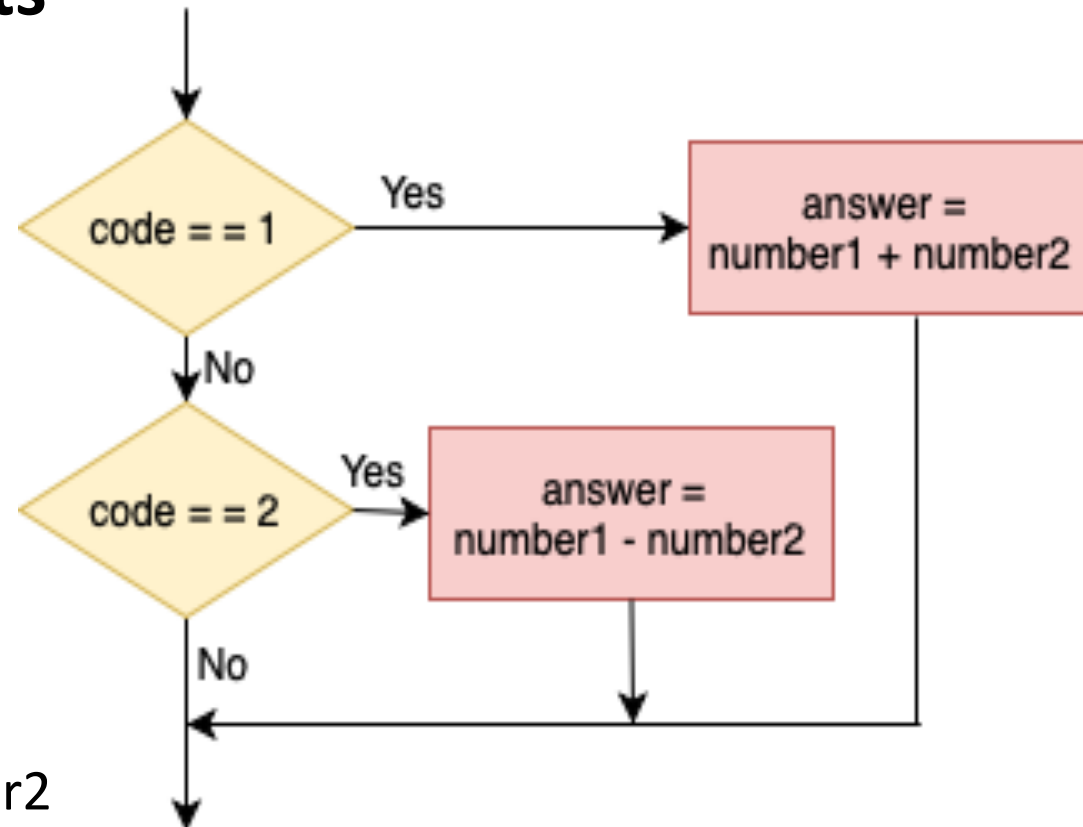
# 8. Linear if statements

### Structure:

```
if (condition1) then  
    statement1  
else if (condition2) then  
    statement2  
endif  
endif
```

### Example:

```
if (code == 1) then  
    answer = number1 + number2  
else if (code == 2) then  
    answer = number1 - number2  
endif  
endif
```





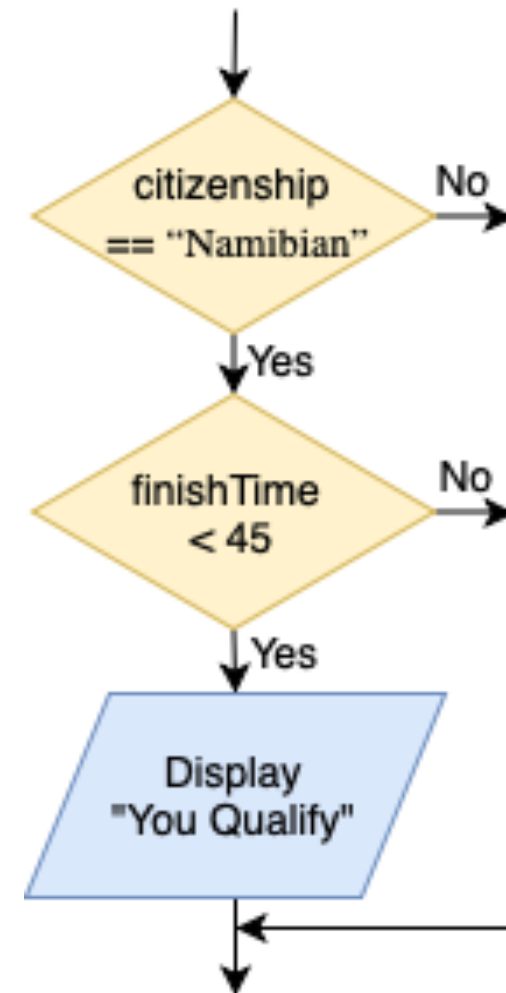
## 9. Nested if statements

Structure:

```
if (condition1) then
    if (condition2) then
        statement
    endif
endif
```

Example:

```
if (citizenship == "Namibian") then
    if (finishTime < 45) then
        display "You Qualify"
    endif
endif
```





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# 10. Unnesting the nested if statements

- all nested if statement can be replace by a logical AND operator;

### Nested if statement:

```
if (citizenship == "Namibian") then
    if (finishTime < 45) then
        display "You Qulify"
    endif
endif
```

### Logical AND operator:

```
if ((citizenship == "Namibian") AND (finishTime < 45)) then
    display "You Qulify"
endif
endif
```



## 11. Case Structure

Linear if statements:

```
if (code == 1) then
    answer = number1 + number 2
else if (code == 2) then
    answer = number1 - number2
else if (code == 3) then
    answer = number1 * number2
else if (code == 4) then
    answer = number1 / number2
else
    display errorMessage
endif
endif
endif
endif
```

- an alternative to linear if statements;

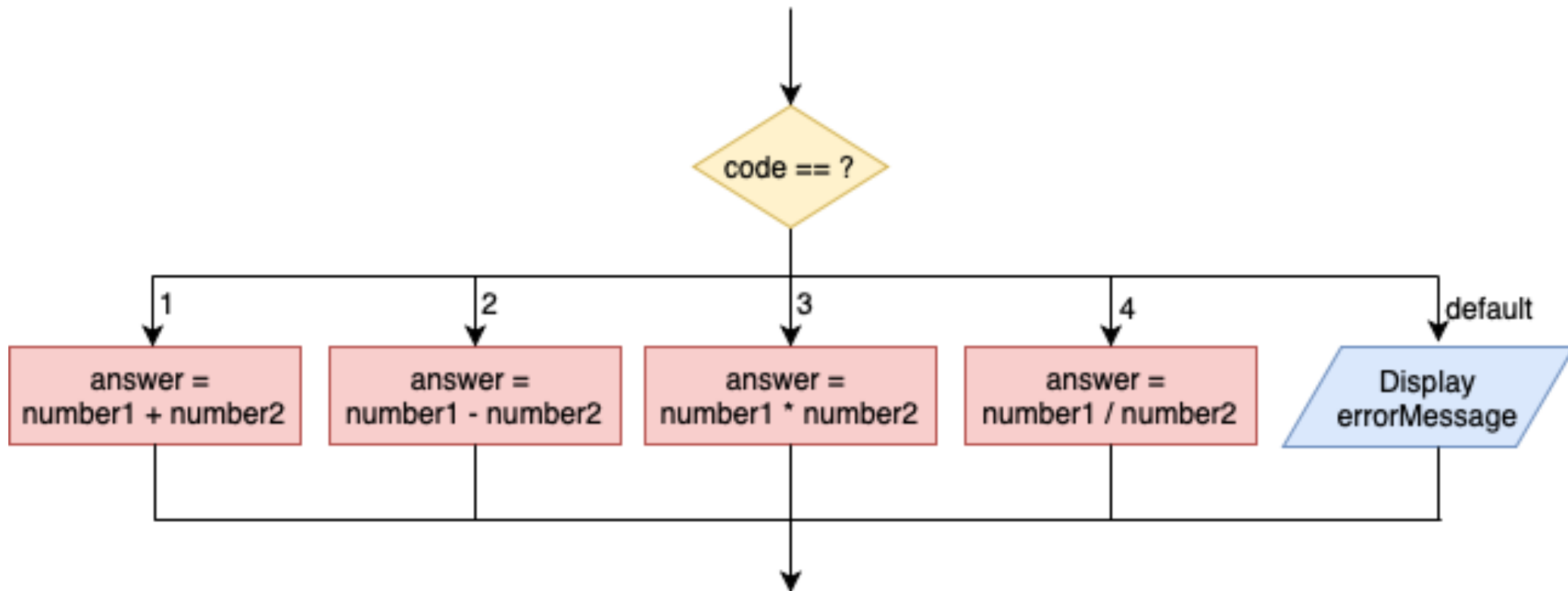
Case Structure:

```
case of (code) {
    1: answer = number1 + number2
    2: answer = number1 - number2
    3: answer = number1 * number2
    4: answer = number1 / number2
    default: display errorMessage
endcase
```



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## 12. Case Structure Flowchart





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## 13. Case Structure Limitations

- cannot have logical operators;
- does not allow for a range of values;

What do you think are the benefits of the case structure?



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### 14. Exercise

- An local investment company AA gives 8.2% annual interest for money left in a client's account. An additional 2.7% is given if the money is left for at least 30 days. Design a program that will receive the amount and number of days the money is kept with the company before calculating the interest payable.





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## 15. Further Study

- <http://cs.tsu.edu/ghemri/cs248/classnotes/algorithmdev.pdf>



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# Thank You.