

## Activity 1

Look through the code and write on chat errors taken place?

```
#include<stdio.h>
void main()
{
    int x = 10;
    int y = 15;

    printf("%d", (x, y))
}
```

**Look through the code and write on chat what is wrong here?**



```
#include<stdio.h>
int main(void)
{
    while(.)
    {
        printf("hello");
    }
    return 0;
}
```

**Look through the code and write on chat what is wrong here?**



```
#include<stdio.h>
void main()
{
    int n = 9, div = 0;

    div = n/0;

    printf("resut = %d", div);
}
```

**Look through the code and write on chat what is wrong here?**



```
int main()
{
    int i = 0;

    for(i = 0; i < 3; i++);
    {
        printf("loop ");
        continue;
    }
    getchar();
    return 0;
}
```

**Look through the code and write on chat what is wrong here?**



```
void main()  
{  
    int a, b, c;  
    a + b = c;  
}
```

**Look through the code and write on chat what is wrong here?**



# Types of errors

## 12.1C: System testing

### Learning objectives

- 12.5.3.1 describe execution errors at programme startup
- 12.5.3.5 describe a syntax error in a programme code
- 12.5.3.6 describe a logic error in a programme code



# Learners will be able to:

- Know what different types of programming errors can occur.
- Describe different error types.
- Be able to recognise errors in program code.
- Apply skills to fix the error.
- Combine this as part of the testing approach.



# Activity 2. Group work (7 min)

Task: Complete the mindmap on topic of error types together

1. Review the text material about error type,
2. Discuss in group and highlight 3 features that distinguish it from other types
3. Give 2 specific examples with code
4. Share your information with class using mindmap

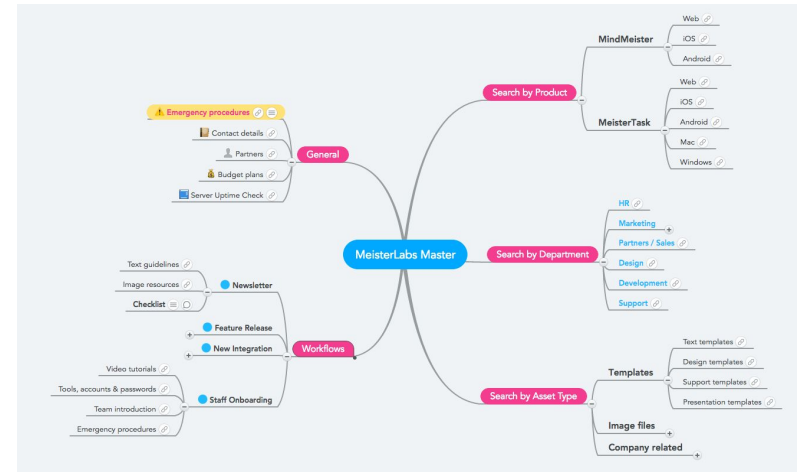
Error types

- Syntax Errors (1-group)
- Logical Errors (2-group)
- Run-time Errors (3-group)
- Latent Errors (4-group)

## Assessment

Know what different types  
of programming errors can occur.

Describe different error types.



<https://www.mindmeister.com/ru>

# Syntax Errors

- Spelling mistakes
- Missing out quotes
- Missing out brackets
- Using upper case characters in key words e.g. IF instead of if
- Missing out a colon or semicolon at end of a statement
- Using tokens in the wrong order
- Undeclared function definitions
- Undeclared variable definitions

# Run-time Errors

- Infinite Loop
- Memory De-allocation
- Datatype mismatch
- Logical errors
- Type-checking errors

# Logical Errors

- Incorrect Logic
- Improper Algorithm to code translation
- Miscalculations
- Infinite loops

- *Formal logic* (also known as “mathematical logic”) is the flavor of logic that comes to mind when we speak about computers. It’s based on “propositions” or “Boolean variables” that can be either true or false.

*IF the user is logged in,  
AND the user has the correct permissions,  
THEN show the user the configuration page.*

*IF this exception is uncatchable,  
OR we haven't provided a way to handle it,  
THEN crash.*

# What is the difference?

## Why do we have such error?

### Case 2

```
<!DOCTYPE html>
<html>
<body>
<?php
function divide($dividend, $divisor)
{
    if($divisor == 0)
    {
        throw new Exception("Division by zero");
    }
    return $dividend / $divisor;
}
try {
    echo divide(5, 0);
} catch(Exception $e) {
    echo "Unable to divide.";
}
?>
</body>
</html>
```

Unable to divide.

### Case 1

```
<!DOCTYPE html>
<html>
<body>
<?php
function divide($dividend, $divisor)
{
    if($divisor == 0)
    {
        throw new Exception("Division by zero");
    }
    return $dividend / $divisor;
}

echo divide(5, 0);
?>
</body>
</html>
```

Fatal error: Uncaught Exception: Division by zero in C:\webfolder\test.php:4  
Stack trace: #0 C:\webfolder\test.php(9):  
divide(5, 0) #1 {main} thrown in C:\webfolder\test.php on line 4

# Exception

- An exception is an object that describes an error or unexpected behaviour of a script/code.
- User defined functions and classes can also throw exceptions.
- Exceptions are a good way to stop a function when it comes across data that it cannot use.

# Latent Errors

- Latent Errors are the 'hidden' errors that occur only when a particular set of data is used.
- For example:  
$$result = (a+b)/(c-d);$$
- An error occurs only when c and d are equal because that will make remainder zero (divide by zero error). Such errors can be detected only by using all possible combinations of data.



# How to find and fix errors in the system?

- **Debugging** is the process of finding errors in the source code (detection), understanding why they occurred (diagnosis) and correcting them. Errors are found through error messages generated by the program or the operating system or because the program does not behave as expected.
- **Desk checking or dry running** is the process of checking an algorithm for errors. You do this by pretending to be a computer and executing the steps in the algorithm one by one, while keeping a record or track of the results.
- **Trace table** is a very useful tool which allows you to see the state of your algorithm with as much details as you wish. Each row of the table shows the state of one step in the algorithm and each column shows the value of a variable at that step. The trace table allows you to check the algorithm for errors.



# Practice 1. Individual work (3 min)

- Find the errors and fix them. Parts 4 - 7
- <https://www.canyoucompute.co.uk/errors.html>

## CAN YOU COMPUTE?

HOME KS3 YR 9 J276/01 and J276/02 J276/0

2. Now create you own syntax error and challenge another students to fi

```
main.py
1 first = input("Input the first number ");
2 second = input("Input the second number ");
3 print("The sum is",first+second);
4
```

## Assessment

Be able to recognise errors in program code.

Apply skills to fix the error.

Describe different error types.

# Activity 3. Individual work

- Worksheet 1
- Worksheet 2

## Assessment

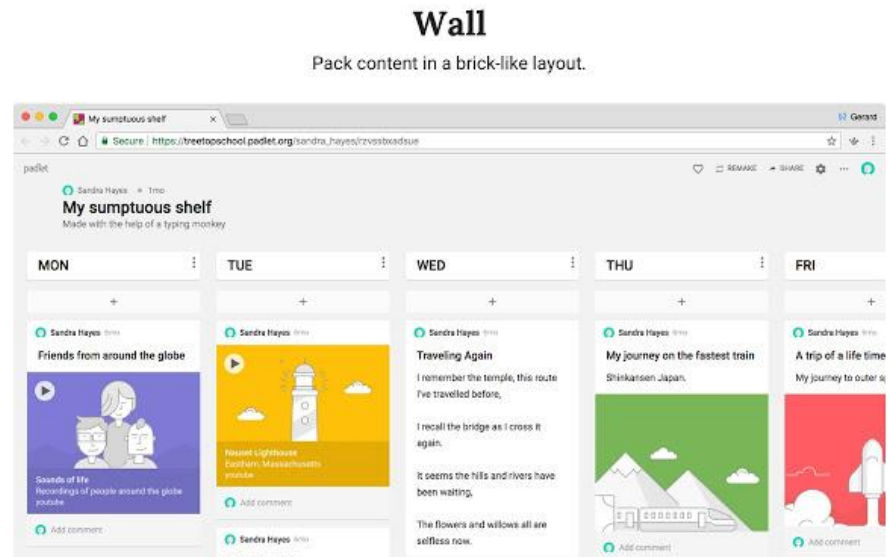
Describe different error types.

Be able to recognise errors in program code.

Apply skills to fix the error.

# Reflection

1. Do conclusion on the topic of the lesson.  
Write 3 sentences at least on teachers padlet wall.
2. What remained unclear for you?  
<https://padlet.com/>



# Pair work



- Each student writes some lines of code containing a syntax or logical error for their partner to debug.
- Partner finds and fixes these errors.

# Useful links

- <https://docs.microsoft.com/en-us/azure/azure-sql/database/troubleshoot-common-errors-issues>
- <https://www.stickyminds.com/article/logic-and-software-testing>
- <https://www.geeksforgeeks.org/php-types-of-errors/>
- <https://www.geeksforgeeks.org/errors-in-c-c/>

# Useful links

- <https://textexpander.com/blog/the-7-most-common-types-of-errors-in-programming-and-how-to-avoid-them/>
- <https://arxiv.org/ftp/arxiv/papers/1712/1712.04189.pdf>
- [https://sites.google.com/a/campioncollege.com/it\\_eveningschoool/problem-solving-and-programming/programming-errors](https://sites.google.com/a/campioncollege.com/it_eveningschoool/problem-solving-and-programming/programming-errors)