

SA 2

- Week beginning 17th November (5 weeks away)
- Programming only
- Topics include everything up to **L120 – Lists 2**
 - See BPCompSci for a full list of topics we've covered; read upwards
- If you haven't already, you need to start revising now

Built-in Functions for String Manipulation

Strings

- A `string` is a sequence of `chars`

```
static void Main(string[] args)
{
    string name = "Imani";
    char c = name[2];

    Console.WriteLine(c);
}
```

This program outputs a

Strings



- A **string** is a sequence of **chars**

```
static void Main(string[] args)
{
    string name = "Imani";
    char c = name[0];

    Console.WriteLine(c);
}
```

What does this program output?



Strings

- A **string** is a sequence of **chars**

```
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{
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    char c = name[0];

    Console.WriteLine(c);
}
```

What does this program output? **I**



Strings

- A **string** is a sequence of **chars**

```
static void Main(string[] args)
{
    string name = "Imani";
    char c = name[0];

    Console.WriteLine(c.ToString() + name[3].ToString());
}
```

What does this program output?



Strings

- A **string** is a sequence of **chars**

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static void Main(string[] args)
{
    string name = "Imani";
    char c = name[0];

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```

What does this program output? **In**

Subroutines that return values

- So far, we have covered **procedures** with **parameters** (inputs)
- The only form of ‘output’ we have is writing to the console

Subroutines that return values

- So far, we have covered **procedures** with **parameters** (inputs)
- The only form of ‘output’ we have is writing to the console
- Today, we will use built-in functions that actually return a value in the code
- A **function** is a subroutine that **returns** a value

ToUpper and ToLower

- ToUpper converts all letters in a string to upper case
- ToLower converts all letters in a string to lower case
- These are both subroutines (specifically functions)

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```
Console.Write("Enter word: ");  
string word = Console.ReadLine();  
Console.WriteLine("In upper case: " + word.ToUpper());  
Console.WriteLine("In lower case: " + word.ToLower());
```

Length

- Length is the number of characters in a string
- It is not a subroutine, instead it is a **property**
 - We will see these in more depth next term
- As it is not a subroutine, we **do not** put brackets at the end of it

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```
Console.Write("Enter word: ");  
string word = Console.ReadLine();  
int length = word.Length;  
Console.WriteLine("There are " + length + " characters");
```

Exercise

Write a program that:

- Asks the user for a word and stores it in a local variable
- Lets them between the following options:
 - Displaying the length of the word
 - Displaying the word in upper case
 - Displaying the word in lower case

You have **10 minutes**

- `word.Length`
- `word.ToUpper()`
- `word.ToLower()`

Extension: Investigate the `String.Replace()` function and use it to count the number of non-space characters in the phrase

Substring

- Returns a **substring** of a string, specified by the starting position (counting from 0) and, optionally, the desired length

`.Substring(startIndex)`

`.Substring(startIndex, length)`

- When the length parameter is omitted, the substring contains all of the string from `startIndex` onwards

`word.Substring(0, 2)`

Input: "Hello World"

Returns:

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Returns: He

`word.Substring(2, 4)`

Input: "Hello World"

Returns:

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`.Substring(startIndex, length)`

- When the length parameter is omitted, the substring contains all of the string from `startIndex` onwards

`word.Substring(0, 2)`

Input: "Hello World"

Returns: **He**

`word.Substring(2, 4)`

Input: "Hello World"

Returns: **"llo "**

Substring Activity



Input string	Function call	Return value
"Wingardium Leviosa"	<code>word.Substring(0, 1)</code>	
"Wingardium Leviosa"	<code>word.Substring(1, 1)</code>	
"Wingardium Leviosa"	<code>word.Substring(9, 3)</code>	
"Wingardium Leviosa"	<code>word.Substring(11, 2)</code>	
"Wingardium Leviosa"	<code>word.Substring(3, 3)</code>	
"Wingardium Leviosa"	<code>word.Substring(6, 4)</code>	



Substring Activity

Input string	Function call	Return value
"Wingardium Leviosa"	<code>word.Substring(0, 1)</code>	"W"
"Wingardium Leviosa"	<code>word.Substring(1, 1)</code>	"i"
"Wingardium Leviosa"	<code>word.Substring(9, 3)</code>	"m L"
"Wingardium Leviosa"	<code>word.Substring(11, 2)</code>	"Le"
"Wingardium Leviosa"	<code>word.Substring(3, 3)</code>	"gar"
"Wingardium Leviosa"	<code>word.Substring(6, 4)</code>	"dium"

IndexOf

- Returns the starting position in the string of the first occurrence of the specified string

```
Console.WriteLine("We're looking for 'ham'");  
Console.Write("Enter phrase: ");  
string word = Console.ReadLine();  
int index = word.IndexOf("ham");  
Console.WriteLine("Found at " + index);
```

What is the index given the following input?

1. "ham"
2. "hampton court"
3. "Birmingham"

4. "Ham"

IndexOf

- Returns the starting position in the string of the first occurrence of the specified string

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Console.WriteLine("We're looking for 'ham'");  
Console.Write("Enter phrase: ");  
string word = Console.ReadLine();  
int index = word.IndexOf("ham");  
Console.WriteLine("Found at " + index);
```

What is the index given the following input?

- | | |
|--------------------|---|
| 1. "ham" | 0 |
| 2. "hampton court" | 0 |
| 3. "Birmingham" | 7 |

4. "Ham"

-1

Password generator

Automatically generate a password from information provided by the user.

Format

1st letter of first name in upper case

2nd letter of surname in upper case

Last 2 digits of year of both

2nd and 3rd letters of favourite colour

1st 3 letters of street name

1st digit of their shoe size

Example

Harry

Potter

1980

red

Privet Drive

9

Password: HO80edPri9

Extension: Extract random characters of the personal information instead

String.Compare

- Returns an integer depending on which string comes before the other alphabetically
 - Greater than 0 if first is after the second
 - 0 if they are the same
 - Less than 0 if the first is before the second

```
string string1 = "Abacus";  
string string2 = "Able";  
if (String.Compare(string1, string2) < 0)  
{  
    Console.WriteLine(string1 + " is before " + string2);  
}
```

Casting between char and int

```
char userChar = 'A';  
int userNum = 103;
```

```
Console.WriteLine((int) userChar);  
Console.WriteLine((char) userNum);
```

Worksheet

W107 - C# Built-in Functions

Text-based adventure game

Introduction

- Mini project for this half term, using the skills you've learned so far
 - Practical skills
 - Selection
 - Iteration
 - Procedures
 - Random numbers
 - Employability/transferable skills
 - Creativity
 - Planning
 - Problem solving
 - Independence
 - Resilience

Requirements

- Must be a C#.NET Console Application (so lots of beautiful ASCII art please!)
- Create a basic adventure game based on choices the user makes:
 - There must be a conclusion for each path through the game
 - There must be at least one random element in the game
 - The story of the game is your choice, but the user must be asked to make a choice on at least 3 occasions, each with at least two options that lead to different paths
 - There must be at least one 'successful' conclusion

Advice – make a menu

```
static void Main(string[] args)
{
    Console.WriteLine("Lost in the woods... Nearby there is a Bandit camp. What will you do?");
    Console.WriteLine("[C] Go towards the camp");
    Console.WriteLine("[W] Head further into the woods");
    Console.WriteLine("[R] Follow the sound of running water, towards the river");
    Console.WriteLine("[E] Exit game");
    string userChoice = Console.ReadLine().ToUpper();
    while (userChoice != "E")
    {
        if (userChoice == "C")
        {
            Camp();
            userChoice = "E";
        }
        else if (userChoice == "W")
        {
            Woods();
            userChoice = "E";
        }
        else if (userChoice == "R")
        {
            River();
            userChoice = "E";
        }
    }
}
```

Text-based adventure game

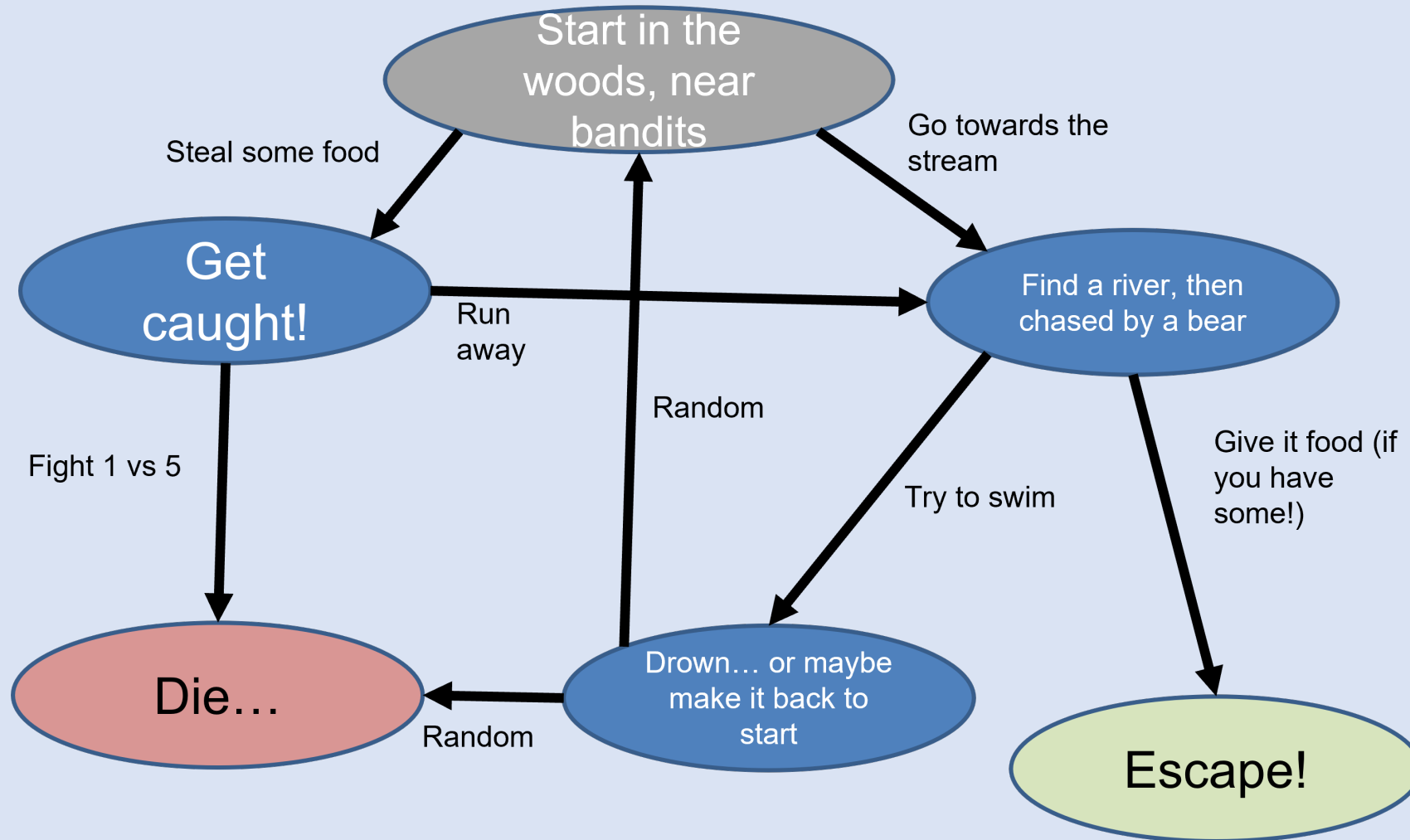
```
        else
        {
            Console.WriteLine("Not a valid choice, try again");
        }
    }
    Console.WriteLine("Thank you for playing");
    Console.ReadKey();
}
```

Advice – make a plan

- Come with a theme idea – it can be as simple or as complex as you like
- Previous ideas include:
 - Breaking into a bank vault
 - Escaping the wilderness whilst being chased by bears
 - Trying to cook spaghetti
 - Surviving a haunted house
 - Computer Science homework simulator

Text-based adventure game

Plan it out



Programming

- User inputs – use different variable types
- if statements, switch/case
- Random number generation
- Subroutines
- Loops for/while/do

Usability

- Make sure it is easy for someone else to play
 - Are the instructions clear?
 - Is it clear what the user should input?
 - Is the story clear?
 - Can it be played in 2 minutes?

Deadline

Tuesday 4th November 2025