what is Microsoft dotnet [.Net]

.net is a software platform.

Every Software platform contains Languages & Technologies.

where to start .net learning

language? technology?

Recall your child hood days?

⍰

tell me your education started with a language or subject?

we started our education with language (english | hindi | …)

we can’t read or learn physics subject written in english without knowing english

languages & technologies supported in .net

languages

c# (csharp)

vb.net

c++.net

jscript.net

....

70+

technologies

asp.net

asp.net mvc

wcf

....

we have to learn only C# (since c# is used mostly in app development)

do we need to learn all languages?

no

C# Learning Sequence

data types

class

object

method

conditions

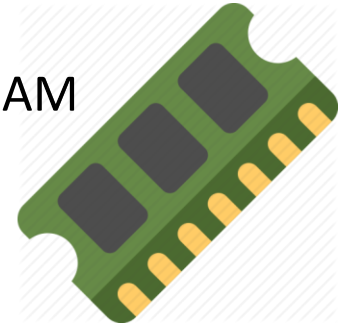
arrays

loops

…

structures

RAM



understand RAM is important for becoming a programmer

since all software code will be finally executed in RAM

data type

what ?

it is a place for storing data

79

this box is now a data type (since it is storing data)

tip

we can call any thing as data type if it is storing data

In real time world we will see

Fixed size containers

Varying size containers

1ltr

before talking about data types it is better to understand fixed size & varying size real world containers

1 kilograms

same way in c# language also we have fixed size datatype and arying size datatype

Types of data types

Fixed size data type

Datatype	Size
long	8bytes
ulong	8bytes
int	4bytes
uint	4bytes
short	2bytes
ushort	2bytes
byte	1byte
sbyte	1byte
char	2bytes
bool	1bit
float	4bytes
double	8bytes
decimal	16bytes

Integral datatype

Integral datatypes can store only plain numbers not decimal numbers Ex: 10 ,88..

Note:

char datatype is a special integral datatype in which we can store any single character

Can store either true or false

floating point data types (can store decimal values)

Varying size data type

string
array
class
Object class
interface
delegate
enum
struct

No limit

un-signed data types

the data types which can store only +ve values are called as un-signed data types

	Datatype	Size
– +	long	8bytes
+	ulong	8bytes
– +	int	4bytes
+	uint	4bytes
– +	short	2bytes
+	ushort	2bytes
+	byte	1byte
– +	sbyte	1byte

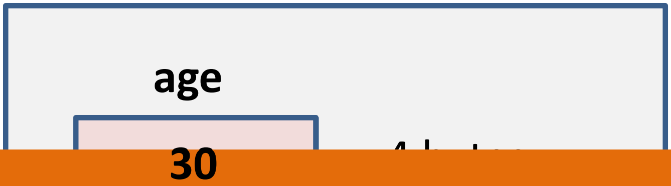
using data types

datatype name= data;

How ?

req: I want to store age

int age=20;



Console.WriteL

How to get program out put ?

Is it possible to c

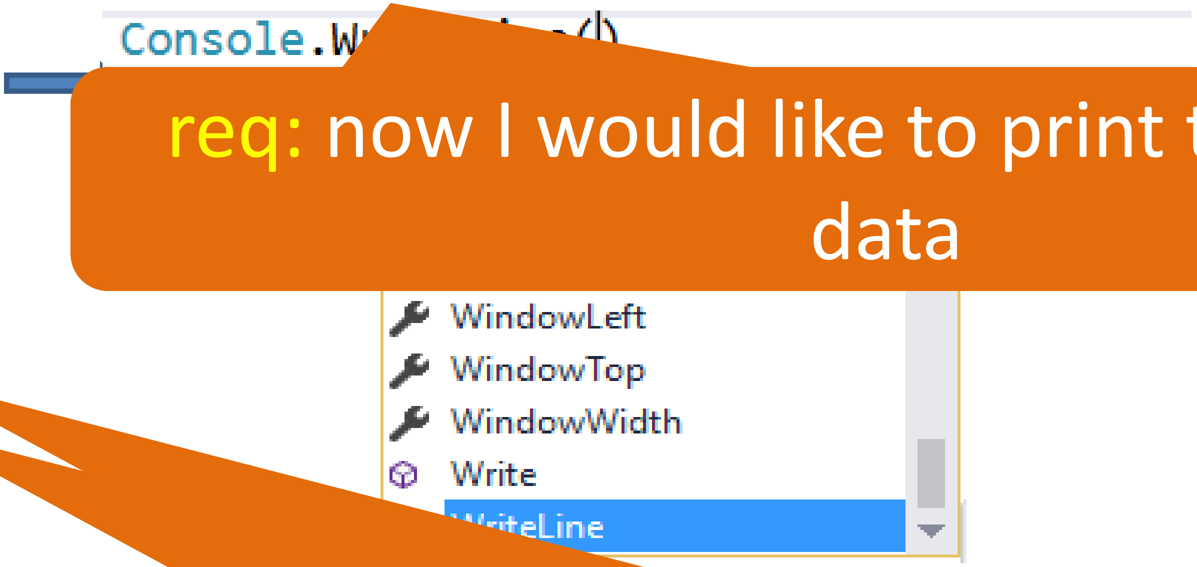
age=30;

Trainer : show how to type this code in vs

will

correct way of typing code in VS

```
int age=20;
```



req: now I would like to print this variable data

It is recommended to write code in Main method body till understanding classes

Execute all code and do all Exercises at Home

End of DAY 1

rules while using c# data types

- for using any datatype we write

  datatype variablename = value;

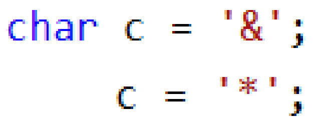
- the above rule will not work some data types like

Datatype
char
bool
float
decimal
string

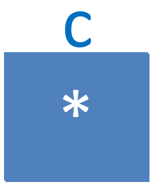
char can stor

ch

can store any single char within single quotes



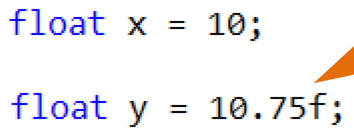
```
char c = '&';
     c = '*';
```



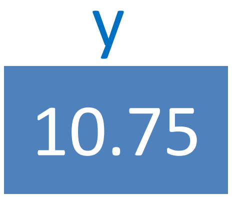
2 bytes

float

if you don’t use f code will not work while storing decimal value in float



```
float x = 10;

float y = 10.75f;
```



4 bytes

Datatype
char
bool
float
decimal
string

decimal can store decimal value
we must place m after decimal

```
decimal x = 800000000.76m;
```

x

16 bytes 800000000.76

if required we can modify value present in any data type

string can store 0 or more values (any type

clr allocates 10 bytes (since in string each char treated as char and hence 2 bytes allocated for each char)

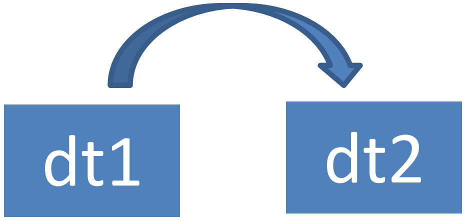
y

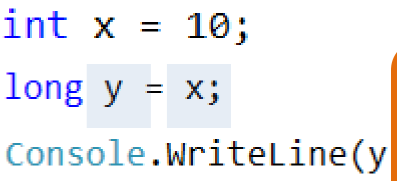
10 bytes p a l l e

data type conversion

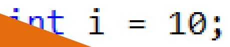
1. implicit copying

2. explicit copying

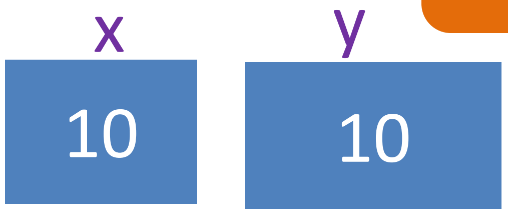




```
int x = 10;
long y = x;
Console.WriteLine(y
```



```
int i = 10;
```

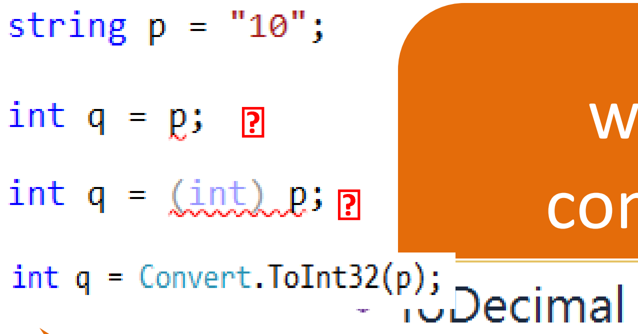


use explicit if implicit fails

possibility of loss of data
when data in bigger container is
able in smaller one
max storable value is
i having value bigger
67 short cant store.

if implicit & explicit conversions are not working then use Convert class methods

3. copying data using Convert class methods



```
string p = "10";

int q = p;

int q = (int) p;

int q = Convert.ToInt32(p);
```

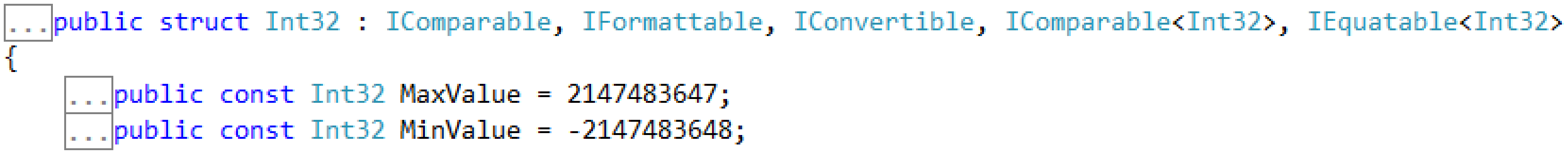
ToDecimal

wh

conv

start observing methods & use common sense to find the matching method

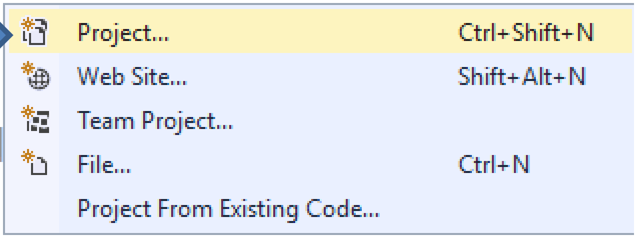
right click on destination data type & go to definition [if you are not able to find suitable method from intellisense] to get more clues



```
...public struct Int32 : IComparable, IFormattable, IConvertible, IComparable<Int32>, IEquatable<Int32>
{
    ...public const Int32 MaxValue = 2147483647;
    ...public const Int32 MinValue = -2147483648;
```

Writing code in visual studio

Open visual studio any version



```
using System;
using System.Collections.Generic;
using System.Linq;
using System.Text;
using System.Thread

namespace myfirstprogarm
{
    class Program
    {
        static void Main(string[] args)
        {
            ---------------
            C# code
        }   ---------------

    }
}
```

OK

Execute all code and do all Exercises at Home

End of DAY 2

class

Class is a virtual entity or a model or a template or a blue print.

Class Syntax:

```
access_specifier   class    classname
{
          c# Code

       ----------variables-------;
       ----------methods-------;
 }
```

```
public  class  A
{
      -----------;
      -----------;
      -----------;
 }
```

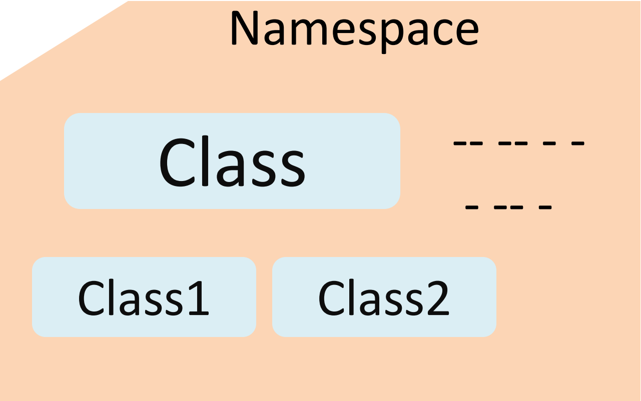
NOTE

1. we usually use public as access specifier
2. c# statements must end with semicolon

Where to write class in C#

Tell me where will you write a class

How many classes can be written in a NS?



Let's see a sample

Assume we have created a new console application with the name sample

```
namespace sample
{
    class Program
    {
        static void Main(string[] args)
        {

        }
    }
}
```

Class before Program class? YES

It is not recommended

Class within Program class? YES

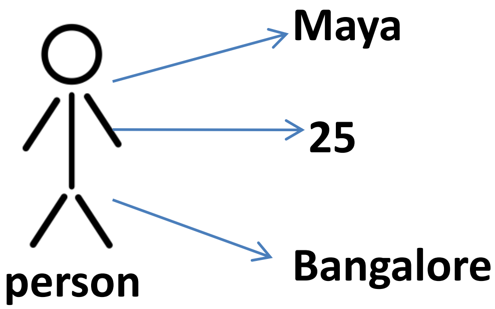
Class within main method? No

Class after Program class? YES

Class after NameSpace? No

Class Sample-1

Create a class for storing person details

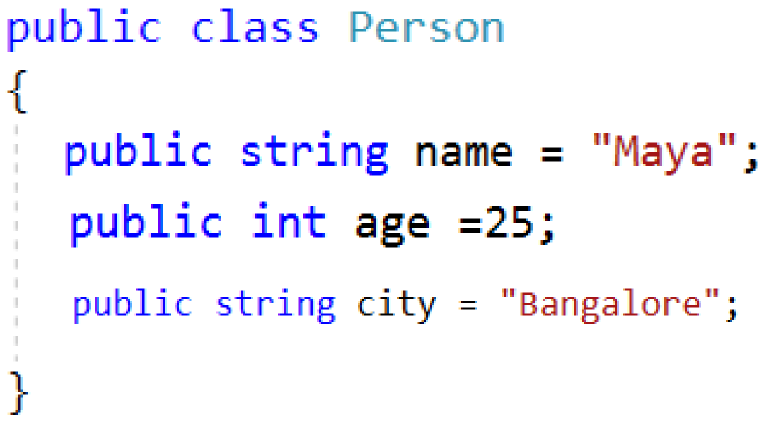


Maya

25

Bangalore

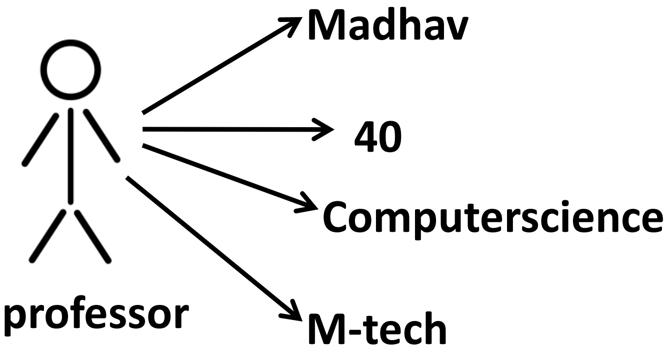
person



```
public class Person
{
    public string name = "Maya";
    public int age =25;
    public string city = "Bangalore";
}
```

Class-Lab1

Create a class for storing professor details



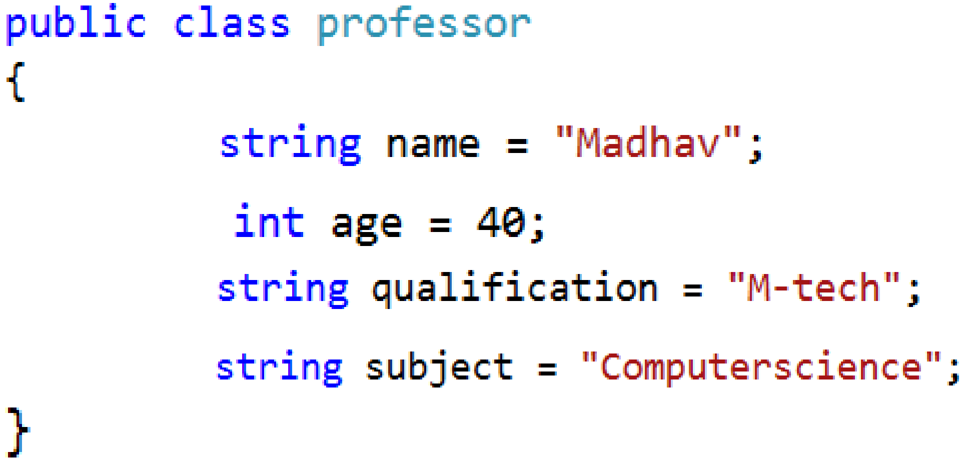
Madhav

40

Computerscience

M-tech

professor



```
public class professor
{
            string name = "Madhav";
             int age = 40;
            string qualification = "M-tech";
            string subject = "Computerscience";
}
```

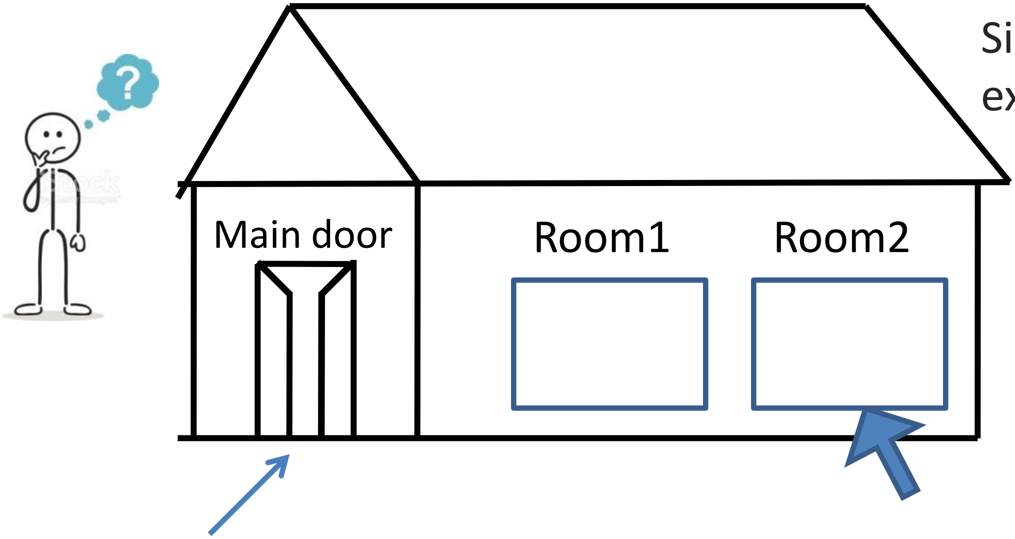
program entry and exit point

Assume there is one house with multiple room

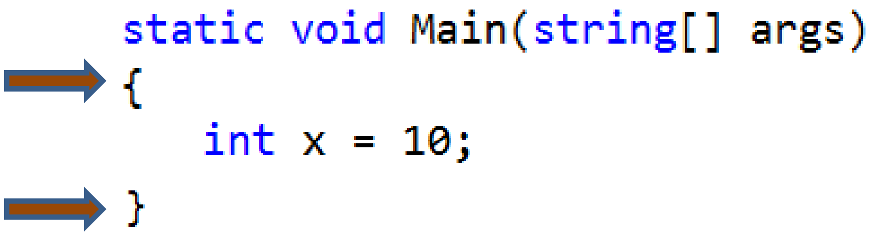
How will you enter into the room?

How will you come out of the house

Again through MainDoor



Similarly ,In Csharp main method is entry and exit point for the Program execution.

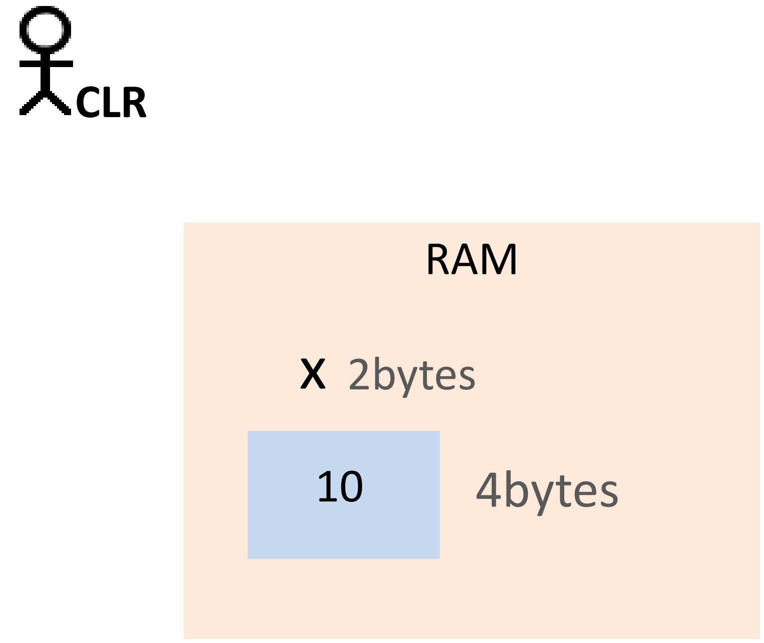


```
static void Main(string[] args)
{
    int x = 10;
}
```

program execution will start and end at main method

class as virtual entity

```
class Program
{
    static void Main(string[] args)
    {
       int x = 10;
    }
}
public class Doctor
{
   public string name = "Dr.Sachin";
   public int age = 36;
   public int exp = 6;
}
```



Execute all code and do all Exercises at Home

End of DAY 3

object

object is a physical entity or a real world entity

Syntax:

classname variablename = new classname();

↓

Used to create object

Creating object sample

LHS RHS

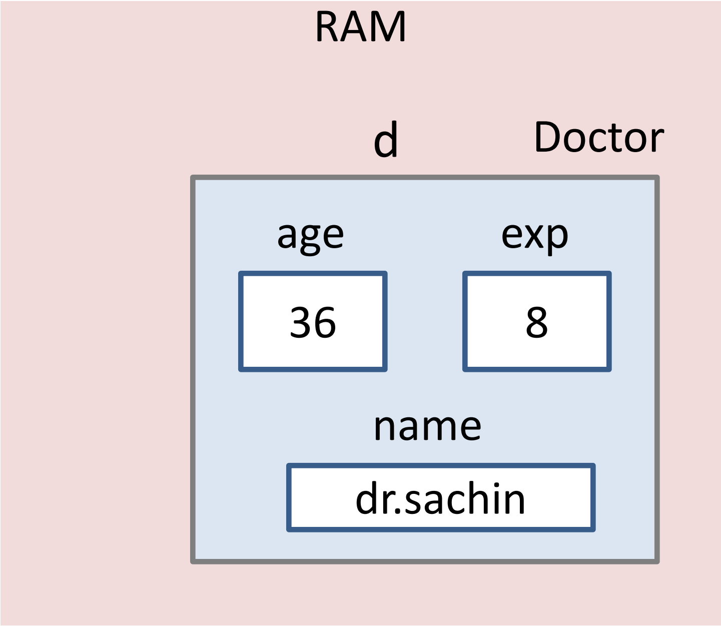
```
class Program
{
    static void Main(string[] args)
    {
     Doctor d = new Doctor();
    }
}
public class Doctor
{
    public string name = "dr.sachin";
    public int age = 36;
    public int exp = 8;
}
```

Responsible for creating object

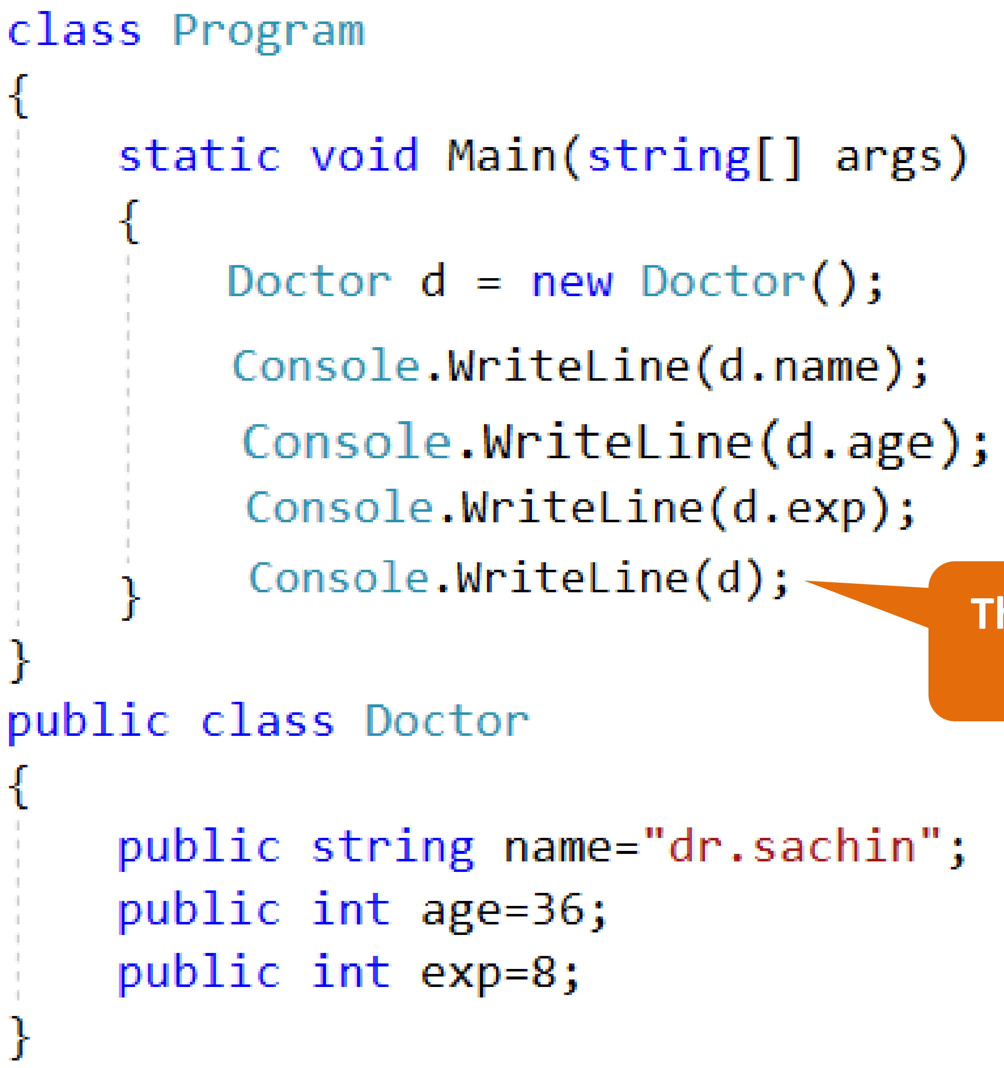
Class name

CLR

How to print the data in object



reading & modifying object data

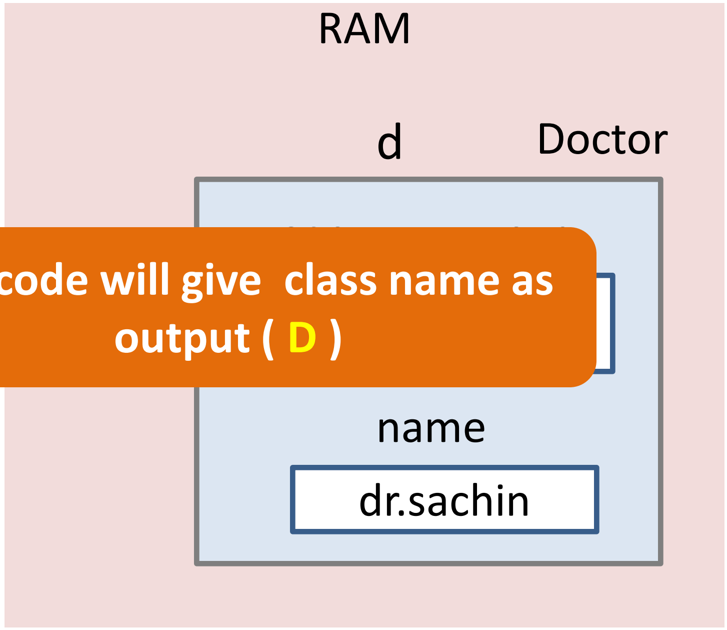


```
class Program
{
    static void Main(string[] args)
    {
        Doctor d = new Doctor();
        Console.WriteLine(d.name);
        Console.WriteLine(d.age);
        Console.WriteLine(d.exp);
        Console.WriteLine(d);
    }
}
public class Doctor
{
    public string name="dr.sachin";
    public int age=36;
    public int exp=8;
}
```

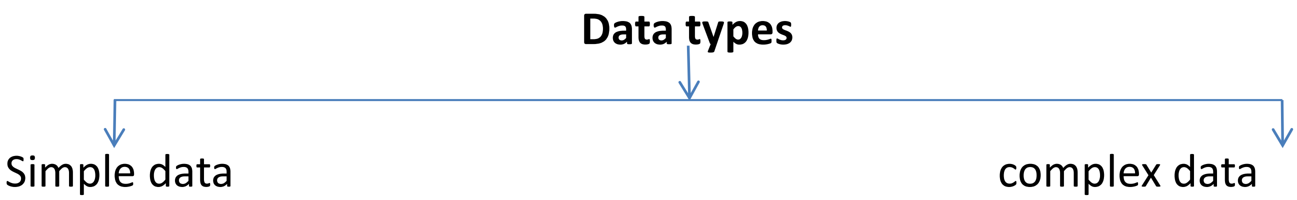
How to read the object data

How to print the data in obje

This code will give class name as output (D)



simple & complex data types



Simple Datatype
long
ulong
int
uint
short
ushort
byte
sbyte
char
bool
float
double
decimal

Can we print the data prese
directly by using variable nam

How to print the da

No, we have to use variable

```
.n(string[] args)
new Doctor();
teLine(x);
dLine();
ame = "dr.sachin";
= 36;
= 8;
```

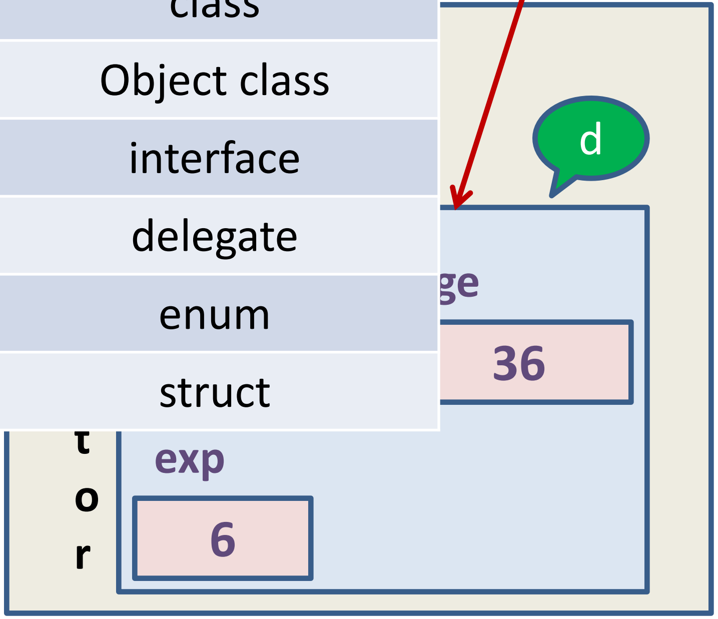
Simpl a type

He t

string is complex data type
but it is used like simple data type

Complex Datatypes
string
array
class
Object class
interface
delegate
enum
struct

ne
data type
: in x



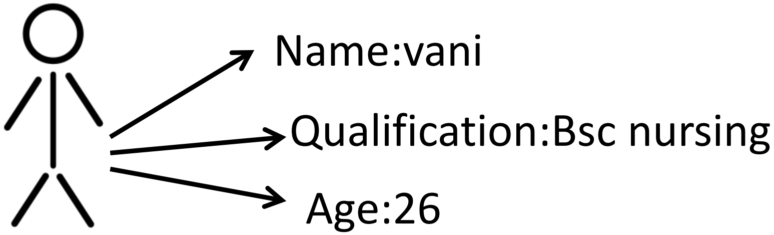
RAM MEMORY

How to modify the data in object

d.age=34

objects assignments

- Create object of nurse class in main method display data present in nurse object



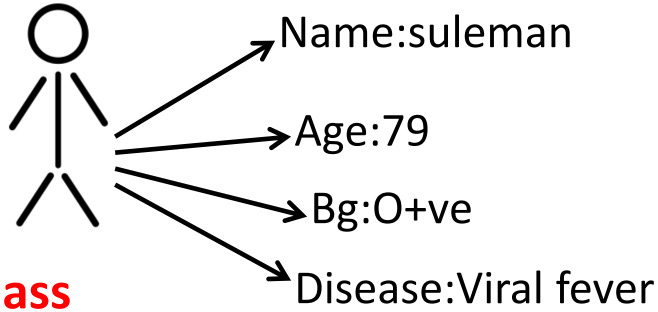
Nurse class

Name:vani

Qualification:Bsc nursing

Age:26

- Create object of patients class in main method display data present in patientsobject



Name:suleman

Age:79

Bg:O+ve

Disease:Viral fever

Patient class

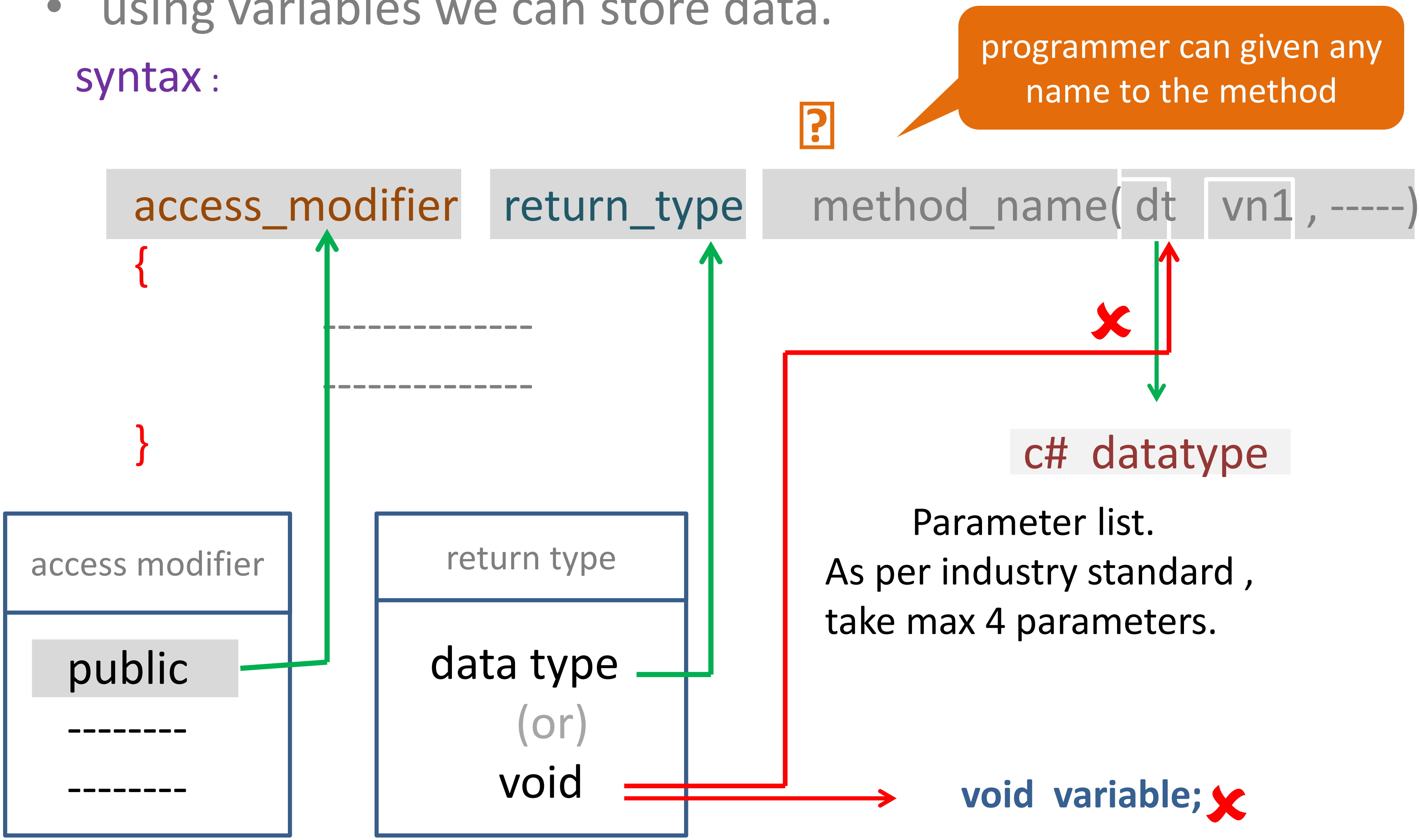
Execute all code and do all Exercises at Home

End of DAY 4

methods

- using methods we can do work (or) perform action.
- using variables we can store data.

syntax :



programmer can given any name to the method

?

access_modifier return_type method_name(dt vn1 , -----)
{

}

access modifier

public

----

return type

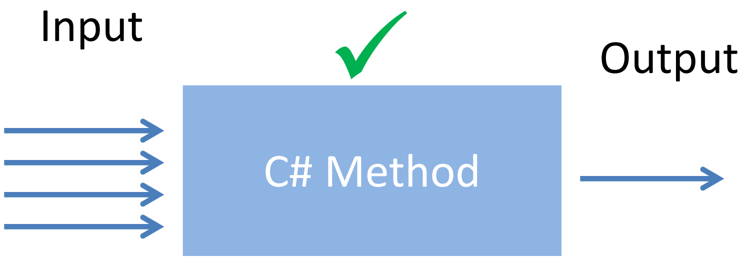
data type
(or)
void

c# datatype

Parameter list.
As per industry standard , take max 4 parameters.

void variable;

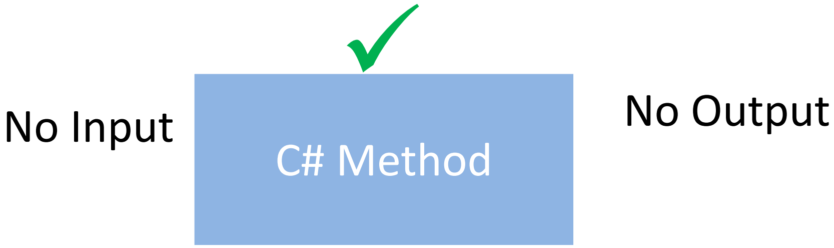
types of methods


Input

✓

C# Method

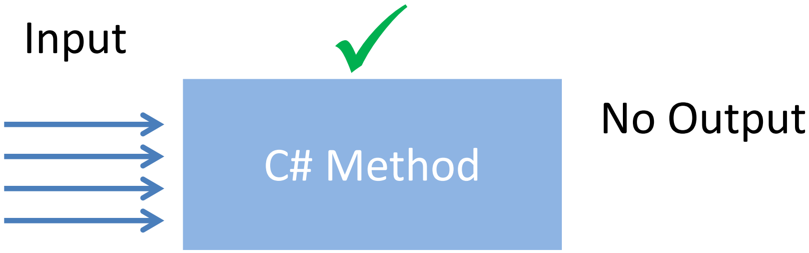
Output


✓

No Input

C# Method

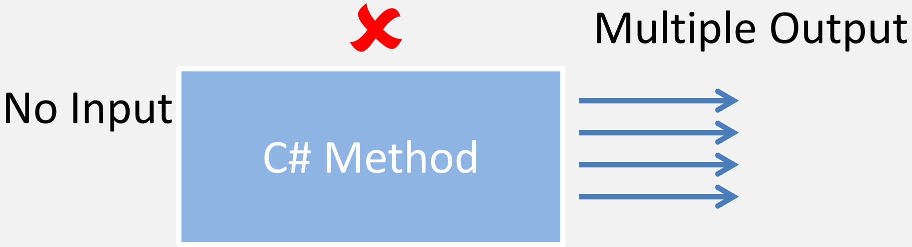
No Output


Input

✓

C# Method

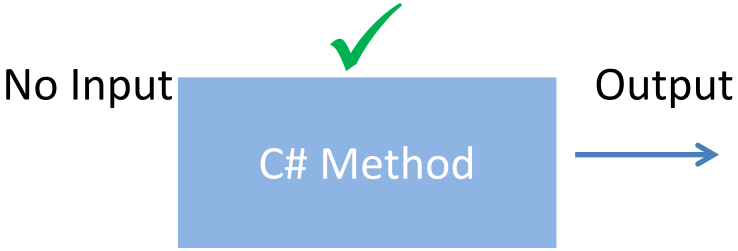
No Output


✗

Multiple Output

No Input

C# Method


✓

No Input

C# Method

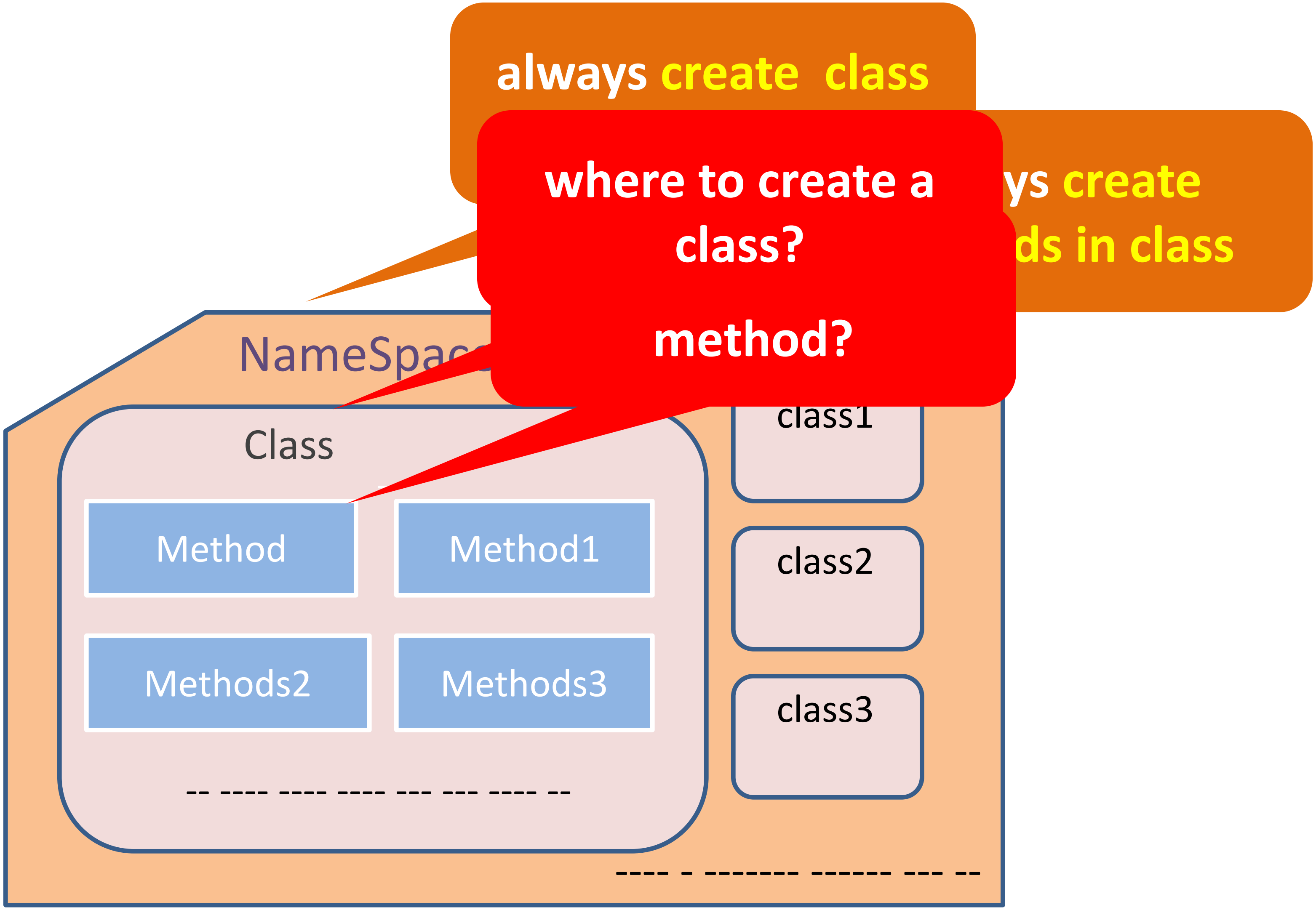
Output

we cannot write multiple return types in a single method. (or) we cannot return multiple values in a single method

Where will you write a method in c# program

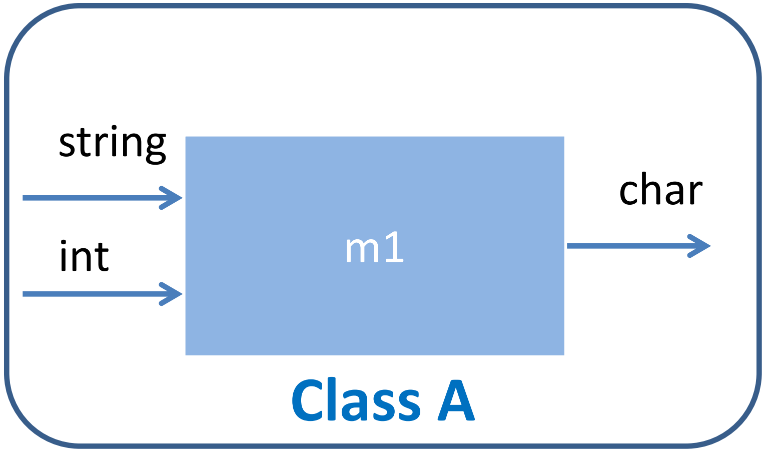
We have to understand the structure of the C# program

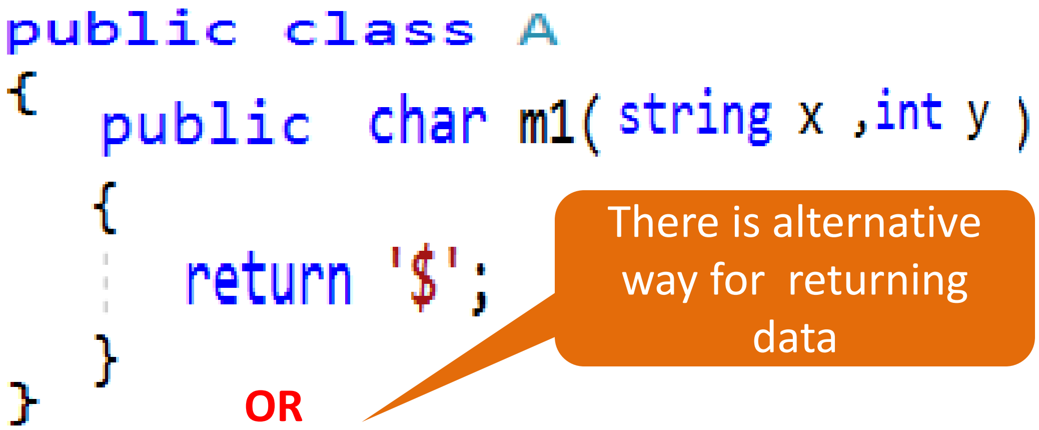
structure of c# program



method declaration sample 1

Req: declare a method with name **m1** in Class **A** which accepts **string** and **int** datatypes as **input** and **returns** **char** datatype as output

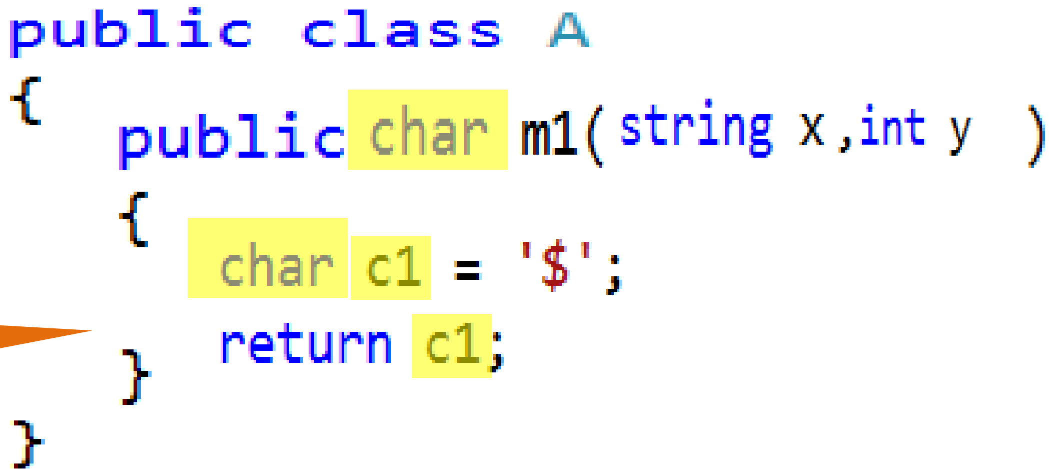




```
public class A
{   public  char m1( string x ,int y )
    {
        return '$';
    }
}
```

There is alternative way for returning data

OR



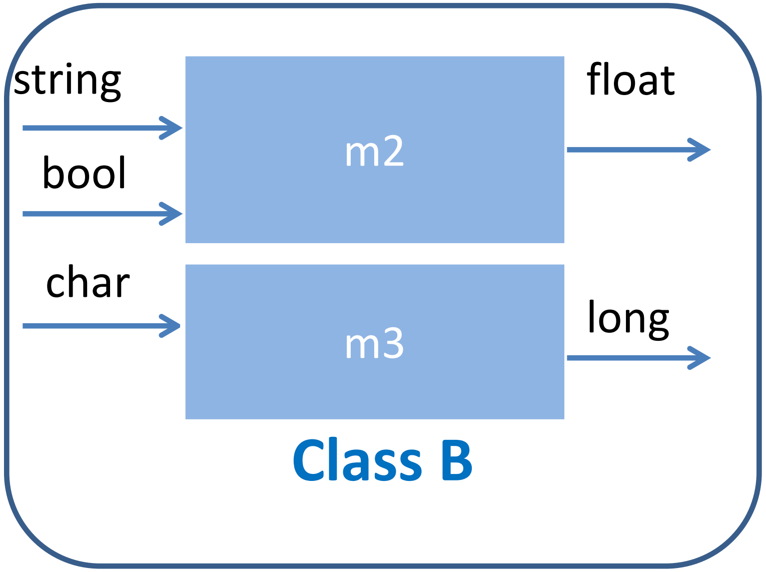
```
public class A
{   public char m1( string x ,int y  )
    {
      char c1 = '$';
      return c1;
    }
}
```

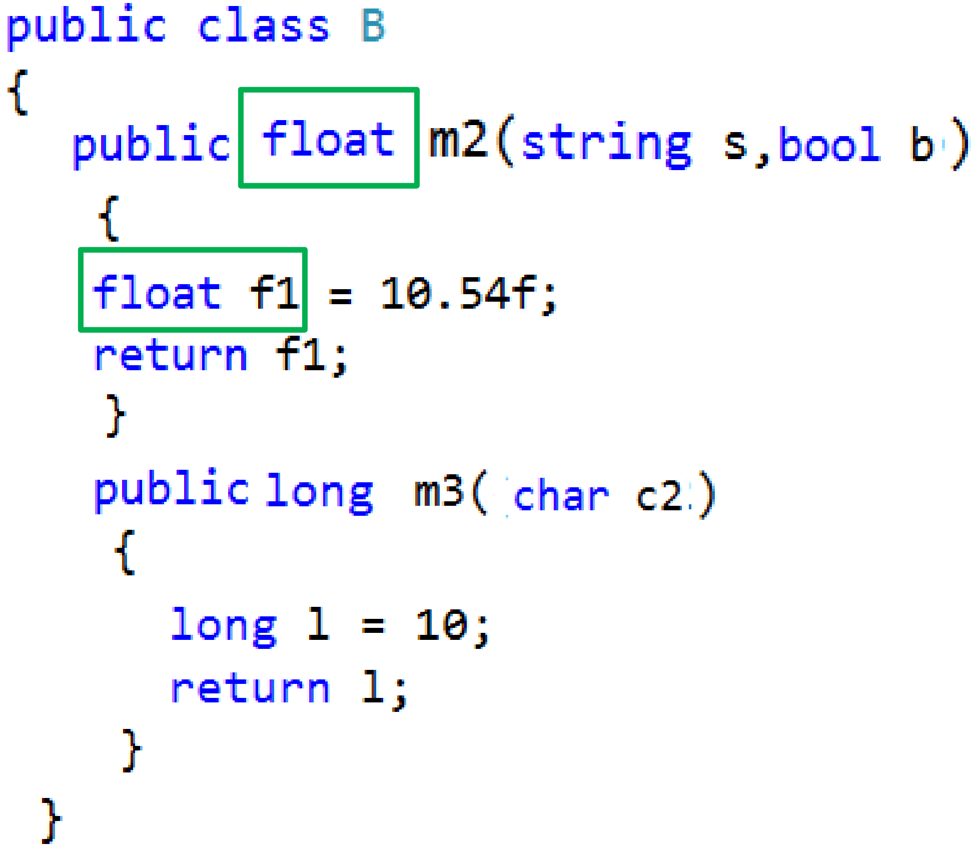
returning variables data type and return type must match

method declaration sample-2

Req1: declare a method (**m2** in class **B**)which accepts **string ,bool** datatypes as **input** and returns **float** as **output**,

Req2: declare another method (**m3** in class **B**) which accepts **char** datatype as **input** and return **long** as **output**





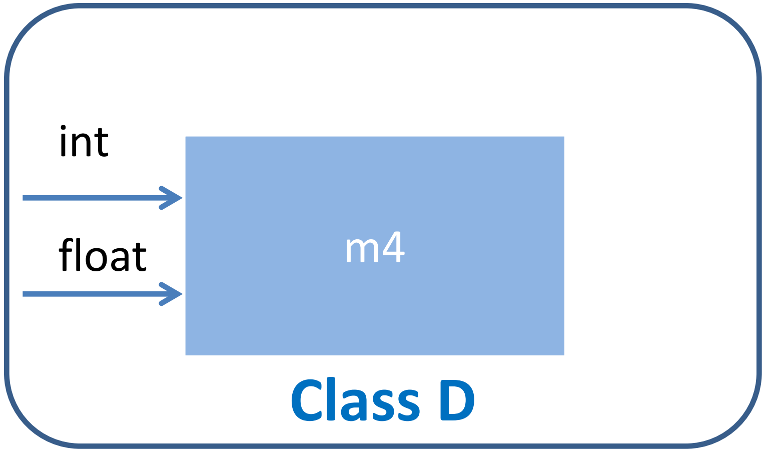
```
public class B
{
   public float m2(string s,bool b)
    {
    float f1 = 10.54f;
    return f1;
    }
    public long  m3( char c2 )
     {
        long l = 10;
        return l;
     }
}
```

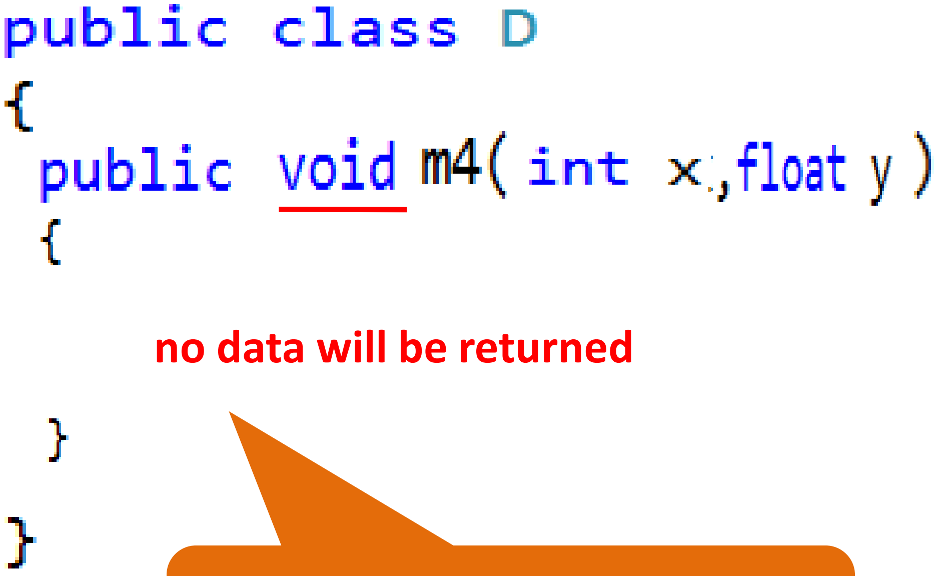
What will be the return type
What data has to be returned

What will be the return type

method declaration sample 3

Req: declare a method(**m4** in Class **D**) which accepts **int** and **float** datatypes as **input** and **returns no output**





```
public class D
{
 public void m4( int x,float y )
 {

 }
}
```

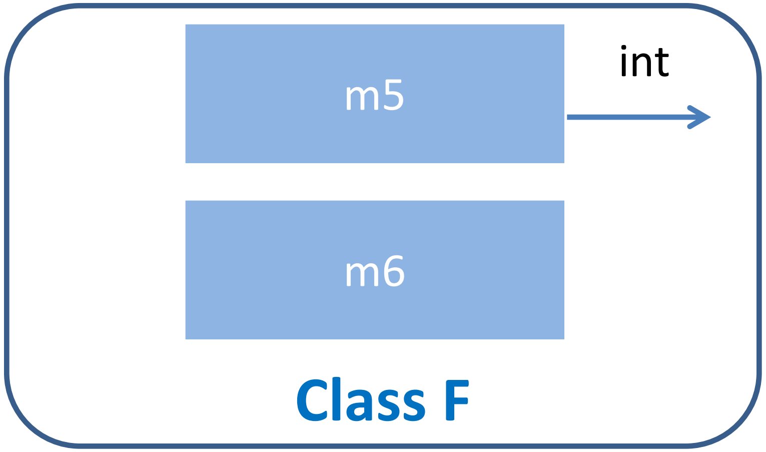
no data will be returned

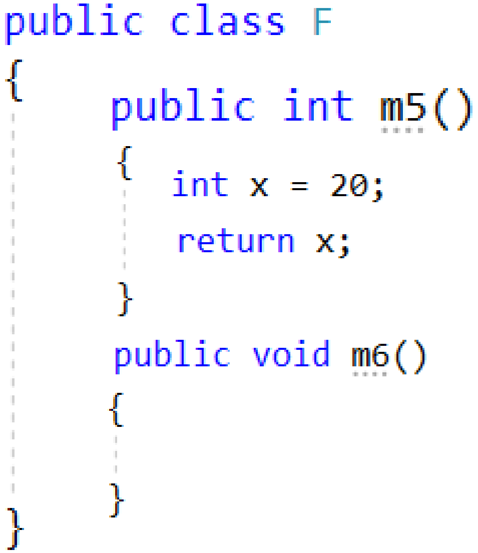
can't write **return** when the return type is **void**

method declaration sample 4

Req1: declare a method (**m5** in class **F**) which accepts **no input** and **returns** **int** data as output

Req2:declare another method(**m6** in class **F**) which accepts **no input** and returns **no output**



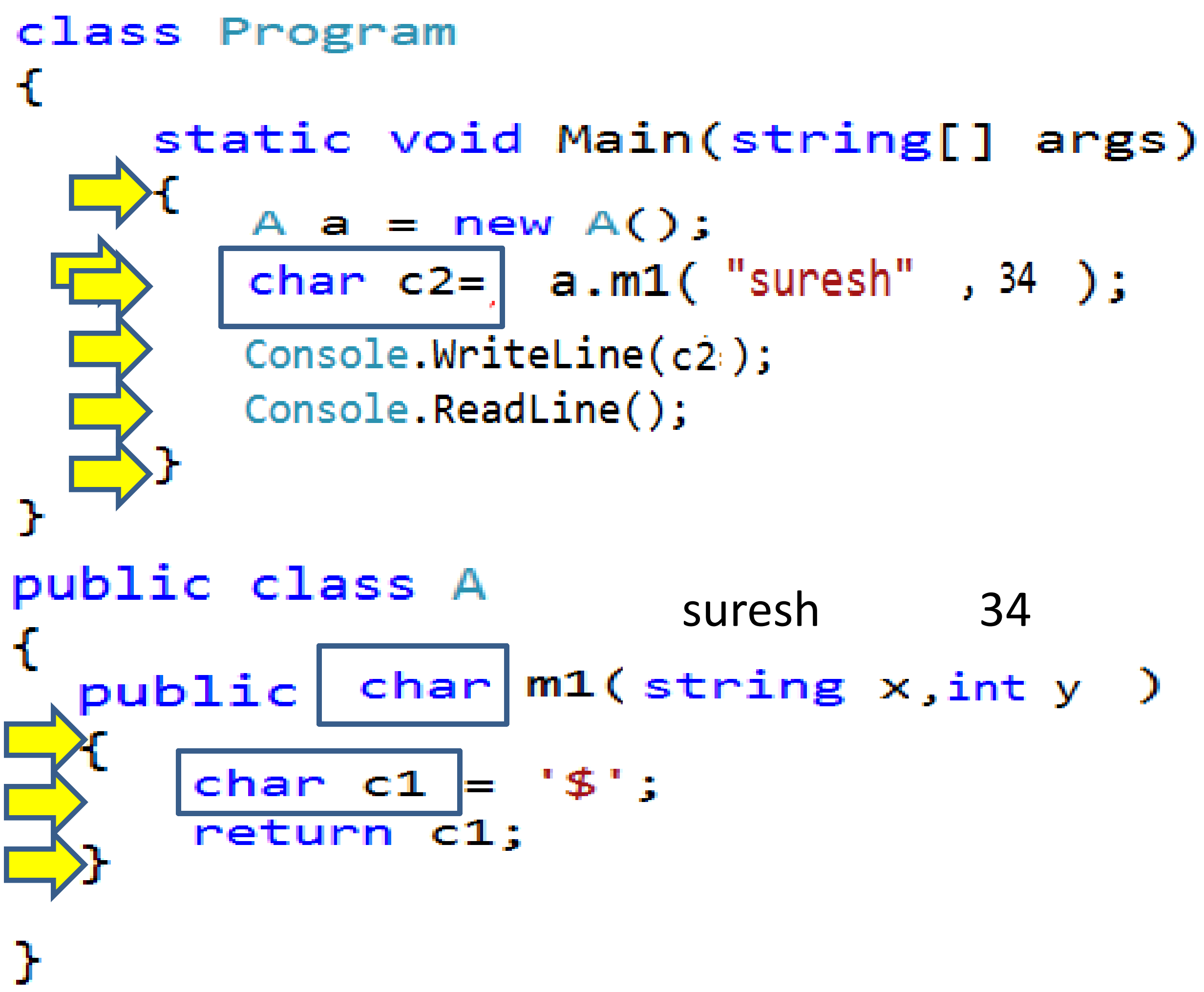


```
public class F
{     public int m5()
      {  int x = 20;
         return x;
      }
      public void m6()
      {

      }
}
```

Execute all code and do all Exercises at Home

End of DAY 5

calling methods



```
class Program
{
     static void Main(string[] args)
    {
       A a = new A();
      char c2=  a.m1( "suresh" , 34 );
      Console.WriteLine(c2 );
      Console.ReadLine();
    }
}
public class A
{
  public  char  m1( string x,int y  )
  {
     char c1 = '$';
     return c1;
  }

}
```

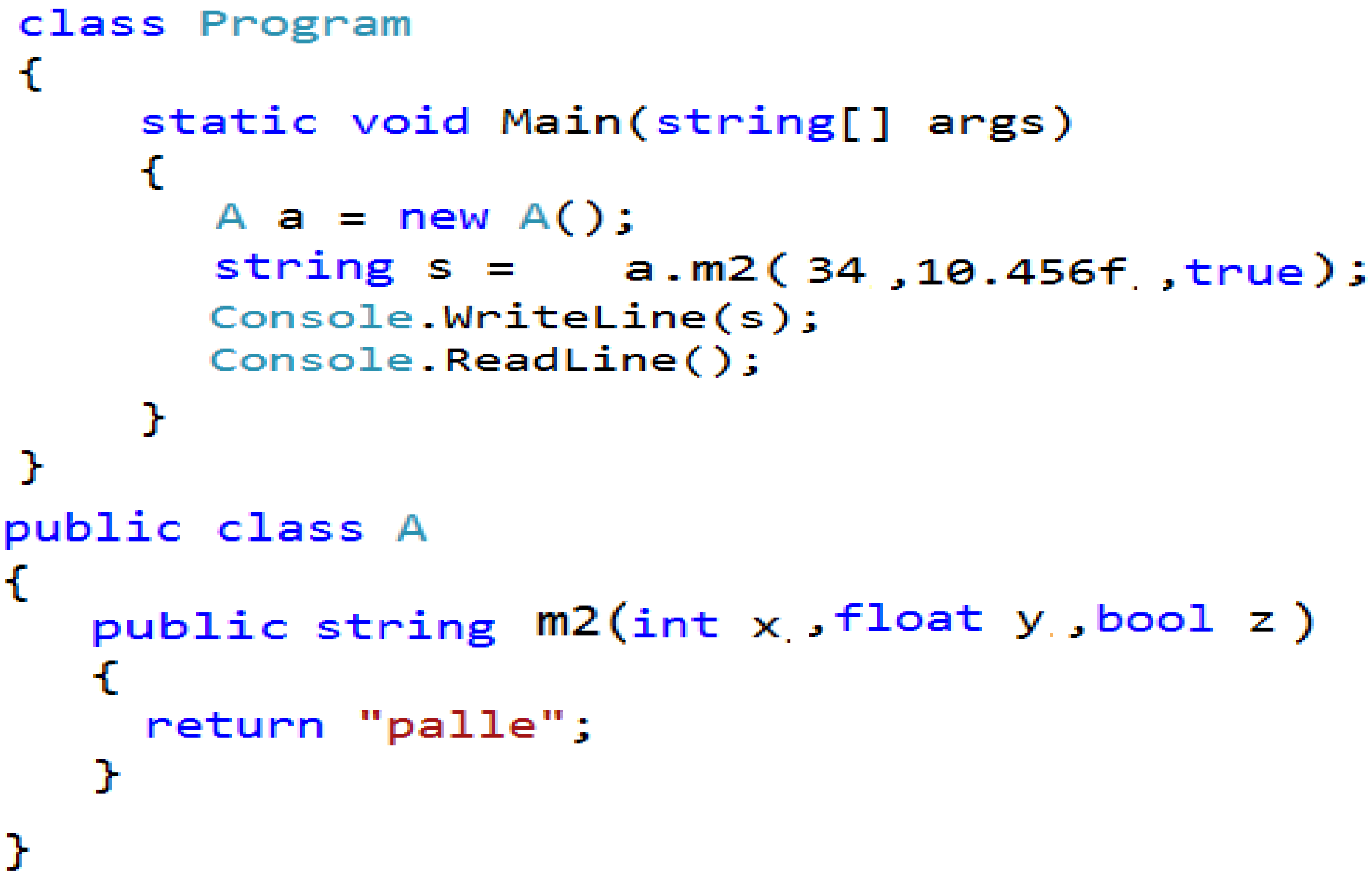
suresh 34

CLR

Output

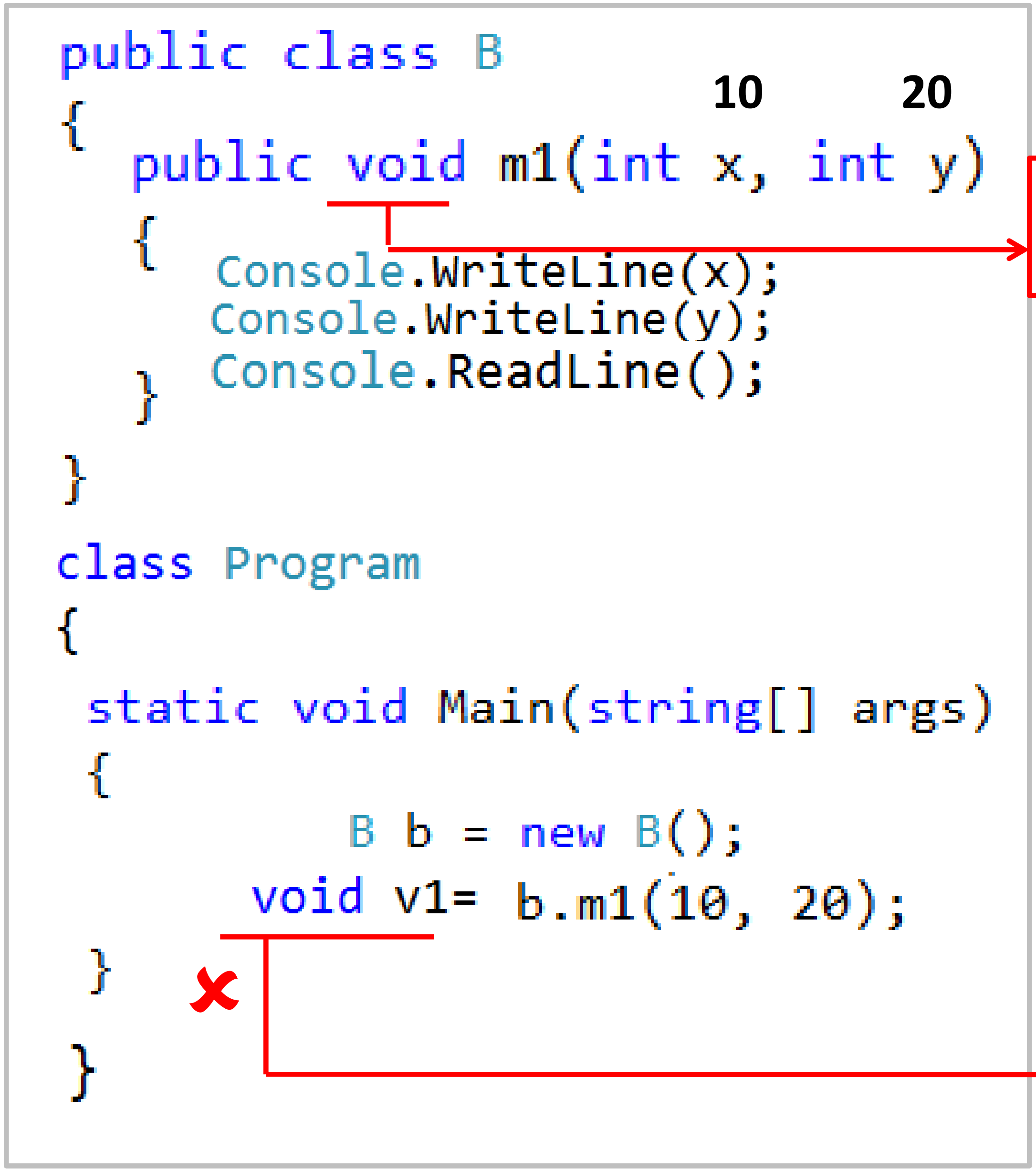
$

calling methods sample2



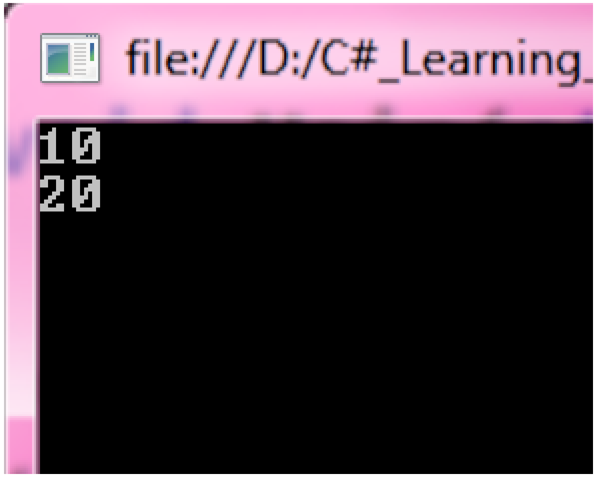
```
 class Program
 {
     static void Main(string[] args)
     {
        A a = new A();
        string s =    a.m2( 34 ,10.456f ,true);
        Console.WriteLine(s);
        Console.ReadLine();
     }
 }
public class A
{
   public string m2(int x ,float y ,bool z )
   {
     return "palle";
   }

}
```

calling methods sample 3 (void return type)



```
public class B
{                                   10        20
  public void m1(int x, int y)
  {
      Console.WriteLine(x);
      Console.WriteLine(y);
      Console.ReadLine();
  }
}

class Program
{
  static void Main(string[] args)
  {
          B b = new B();
      void v1= b.m1(10, 20);
  }   ✘
}
```

You cannot use return keyword if your method returnType is void



```
10
20
```

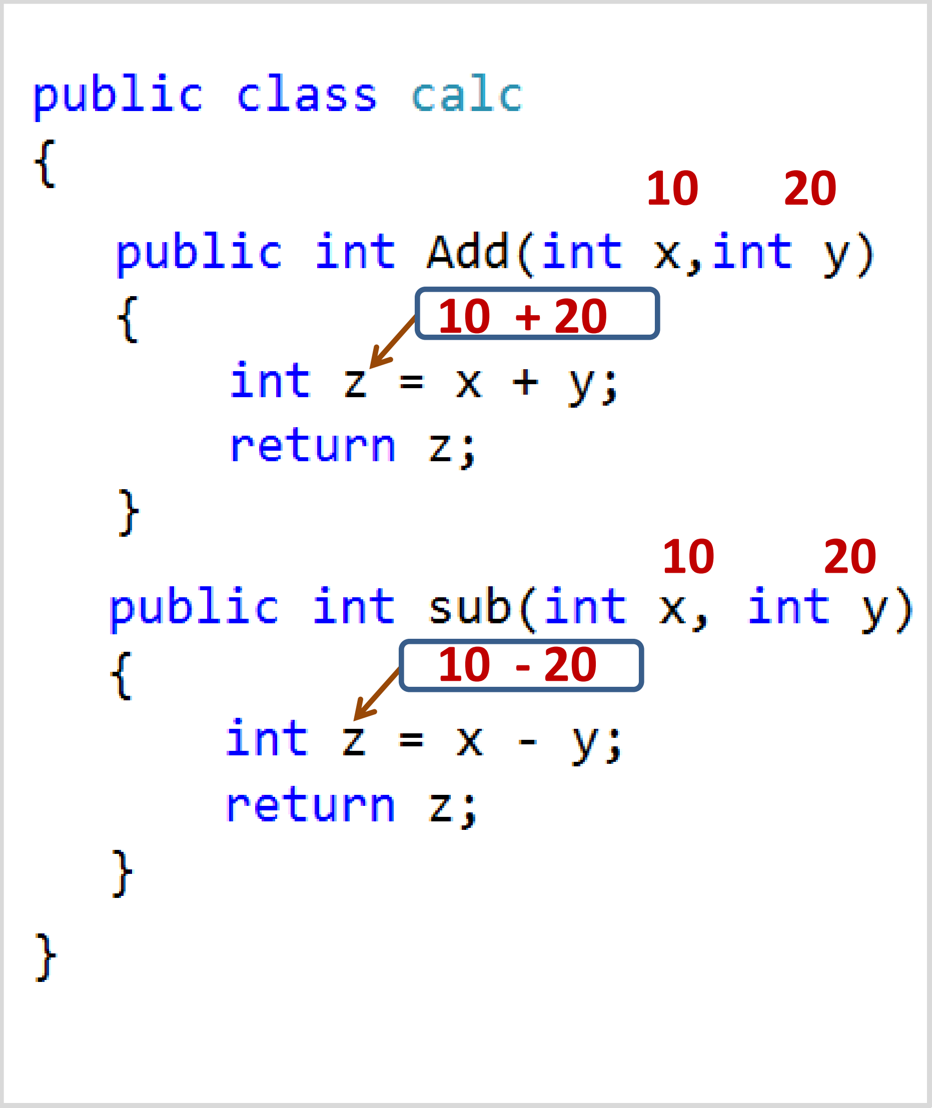
Void type variables are not supported

calling methods sample4

```
class Program
{
  static void Main(string[] args)
  {
    calc c = new calc();
    int result1 = c.Add(10,20);
    int result2 = c.sub(10, 20);
    Console.WriteLine(result1);
    Console.WriteLine(result2);

    Console.ReadLine();
  }
}
```

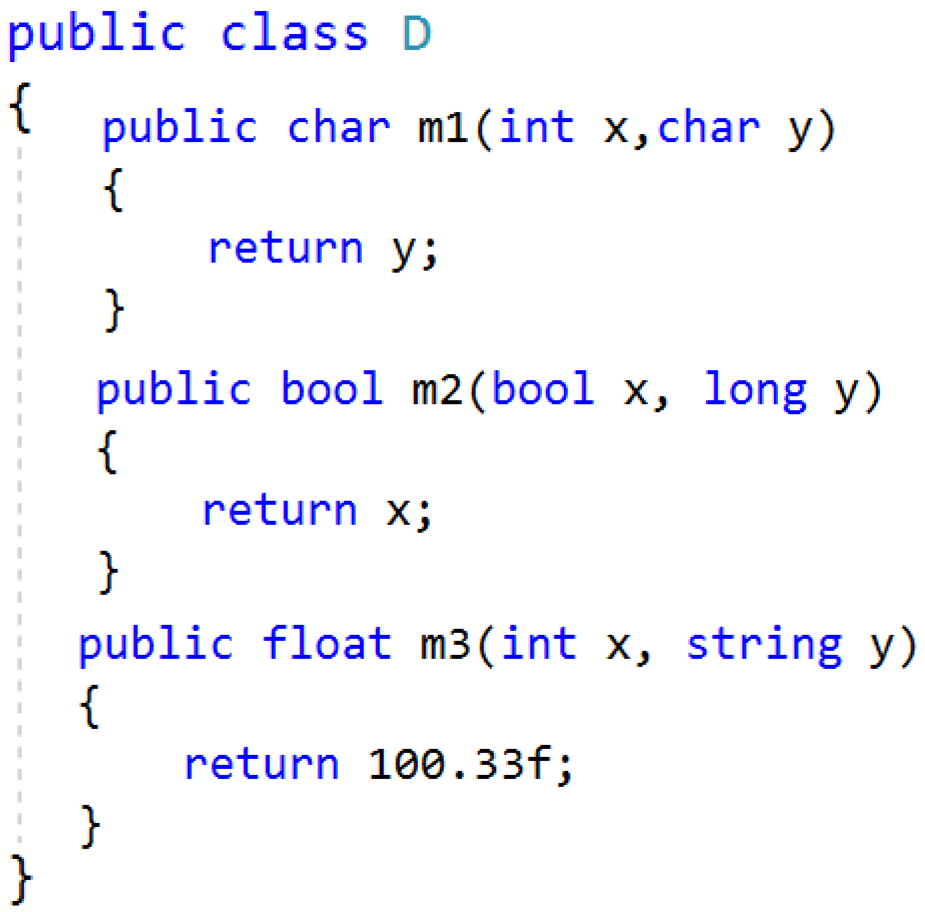
result1 30

result2 -10

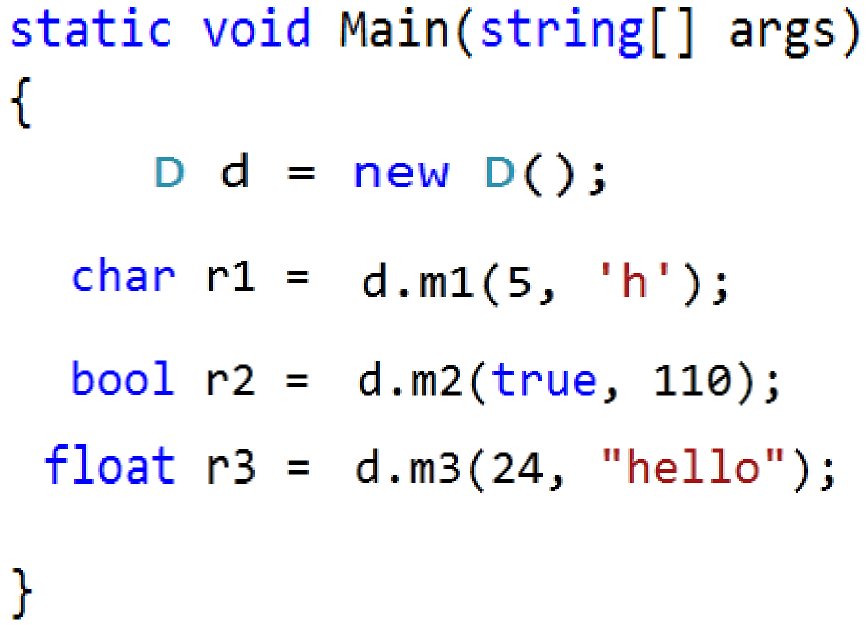


```
public class calc
{

    public int Add(int x,int y)
    {
        int z = x + y;
        return z;
    }

    public int sub(int x, int y)
    {
        int z = x - y;
        return z;
    }
}
```

calling methods lab



```
public class D
{   public char m1(int x,char y)
    {
        return y;
    }
    public bool m2(bool x, long y)
    {
        return x;
    }
   public float m3(int x, string y)
   {
       return 100.33f;
   }
}
```



```
static void Main(string[] args)
{
        D d = new D();

   char r1 =  d.m1(5, 'h');

   bool r2 =  d.m2(true, 110);

  float r3 =  d.m3(24, "hello");

}
```

Call the methods by passing appropriate parameters

naming conventions used in c#

- we must use proper naming conventions while creating real time applications.
- naming conventions will improve code readability and maintainability
- In general while creating .net applications companies will follow either
  - **pascal casing convention**(**every word start with capital letter**)
  - **camel casing convention**(**all chars in first word must be lower case and from second word pascal casing rules are applicable**)

example for pascal and camel naming conventions

Req:

write **patientbeddetails** in pascal and camel naming conventions

pascal casing convention:

PatientBedDetails

camel casing convention:

patientBedDetails

where to use pascal & camel

naming convention

Use Pascal naming when you are giving

- SolutionName
- ProjectName
- FileName
- ClassName
- MethodName
- InterfaceName
- DelegateName
- structName
- GlobalVariableName

use camel naming conventions :

- while declaring local variables

naming standards

- while implementing real applications it is recommended to use good naming standards.
- use complex noun for naming class
- use simple noun for naming variable
- use verb for naming method

verb Is a representation of action

naming standards Lab

Identify which of the following can be used as a class, method and a variable?

- Add
- Person
- Name
- Age
- DateOfBirth
- BloodGroup
- Doctor

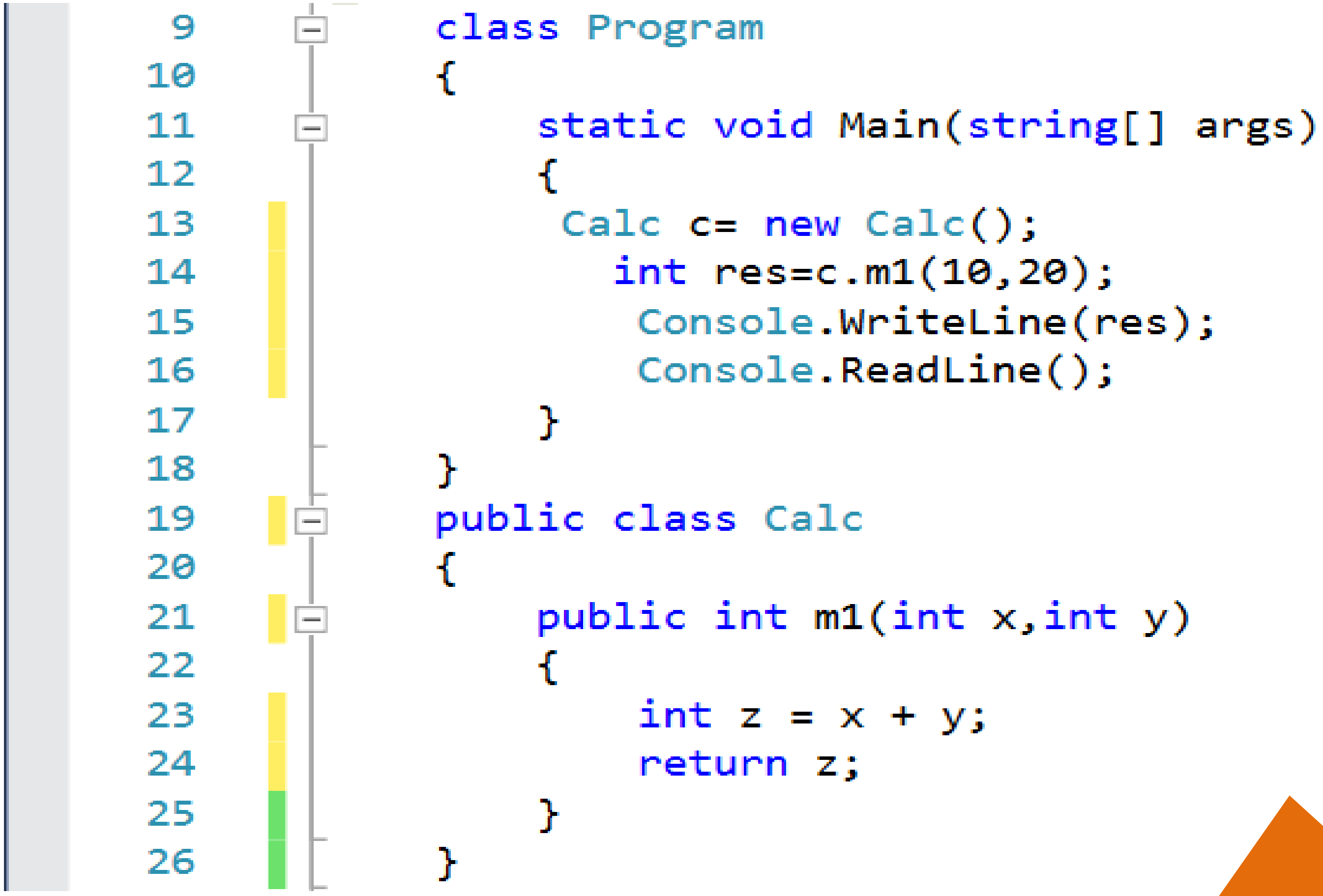
Execute all code and do all Exercises at Home

End of DAY 6

debugging

- Using debugging programmers can understand code execution sequence
- using debugging technique we can understand the logic writing by other programmers.
- debugging will allow us to identify problem locations in the code.

debugging sample

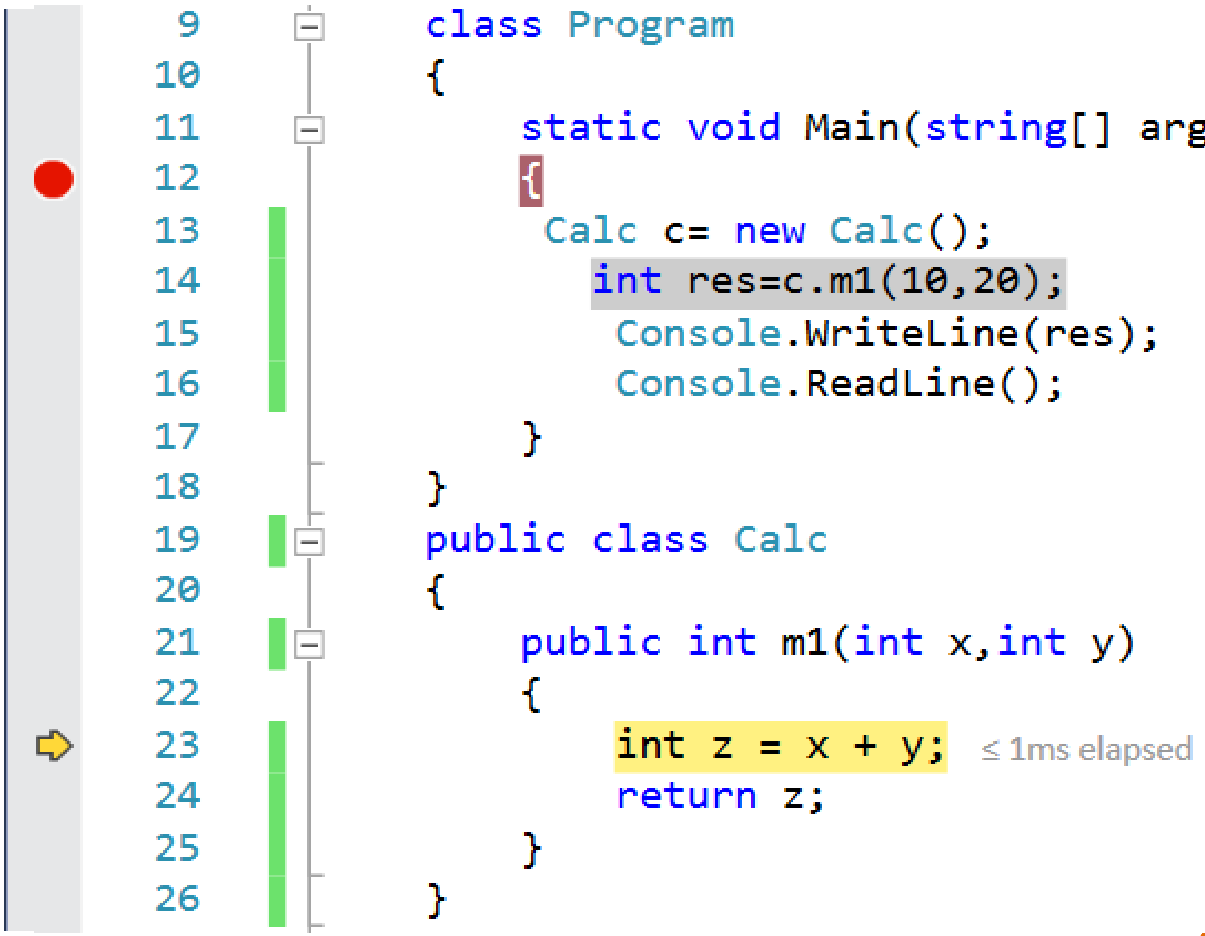


```
class Program
{
    static void Main(string[] args)
    {
     Calc c= new Calc();
       int res=c.m1(10,20);
        Console.WriteLine(res);
        Console.ReadLine();
    }
}
public class Calc
{
    public int m1(int x,int y)
    {
        int z = x + y;
        return z;
    }
}
```

Trainer Note: show debugging directly in vs

Debugging 2

F11



```
class Program
{
    static void Main(string[] args)
    {
     Calc c= new Calc();
       int res=c.m1(10,20);
        Console.WriteLine(res);
        Console.ReadLine();
    }
}
public class Calc
{
    public int m1(int x,int y)
    {
        int z = x + y;
        return z;
    }
}
```

left click with mouse on cement colored wall to insert break point.

conditional statements

we must use conditional statements for executing a piece of code based on result of a condition.

inside the method ?

conditional statements syntax

syntax :

what is **boolean expression**???

An expression which will give either true or false

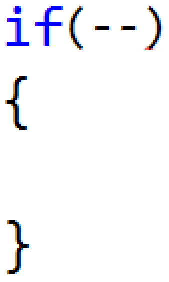
```
if (  boolean expression )
{
      ---------
}
else if ( boolean expression )
{
      ----------
}
....
.....
else
{
      ---------
}
```

we can write 0 or more else if statements

we can write 0 or 1 else statement

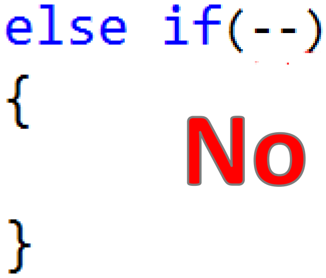
conditional statements rules

✓ YES



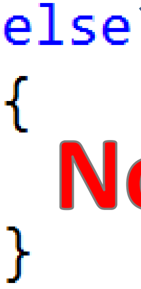
```
if(--)
{

}
```

✗



```
else if(--)
{

}
```

No

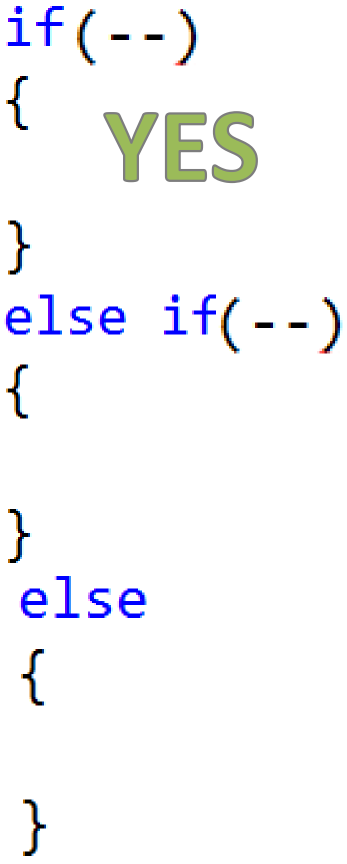


```
else
{

}
```

✗ No

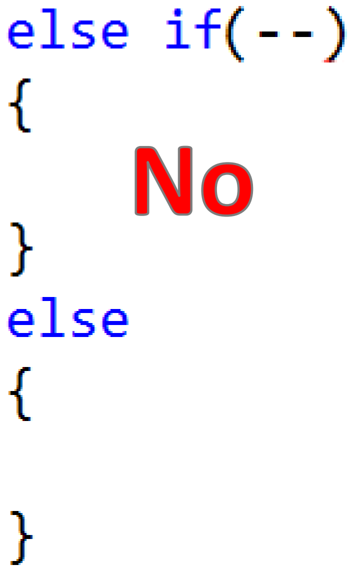
Whether it will work or not ?

Do you think that this code will work?



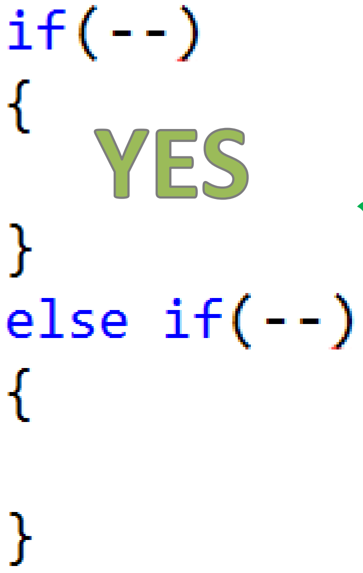
```
if(--)
{

}
else if(--)
{

}
else
{

}
```

✓ YES



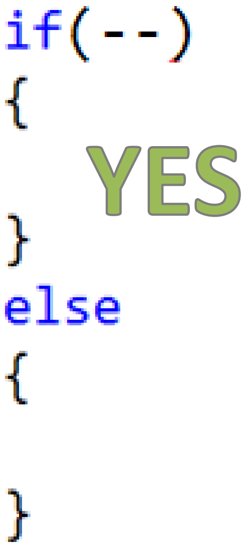
```
else if(--)
{

}
else
{

}
```

✗ No



```
if(--)
{

}
else if(--)
{

}
```

✓ YES



```
if(--)
{

}
else
{

}
```

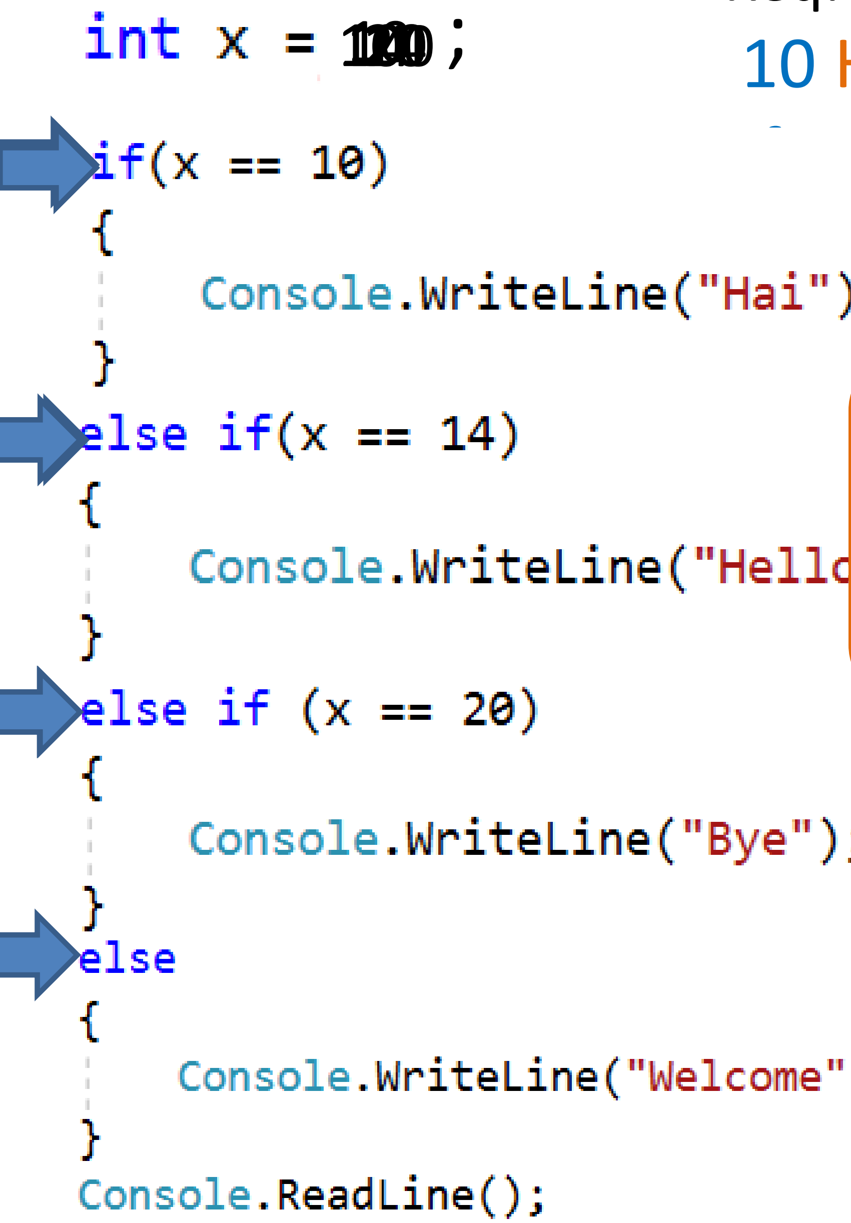
✓ YES

conditions sample 1

Req: print data based on x values.

10 Hai 14 Hello 20 Bye

some thing else print welcome



```
int x = 120;

if(x == 10)
{
    Console.WriteLine("Hai");
}
else if(x == 14)
{
    Console.WriteLine("Hello
}
else if (x == 20)
{
    Console.WriteLine("Bye");
}
else
{
    Console.WriteLine("Welcome");
}
Console.ReadLine();
```

H

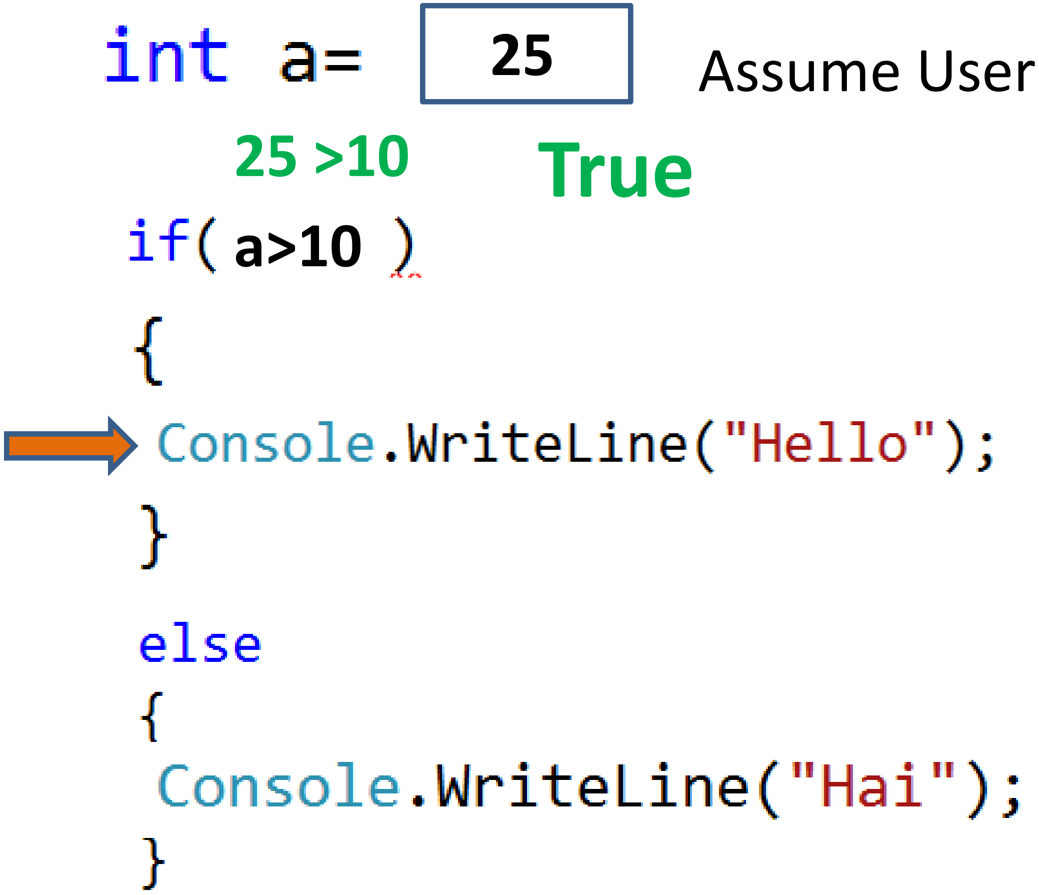
Guess How many conditions are required (How many if, else if and else required)

Bye

Welcome

conditions sample 2

Req:Write Conditional statement for printing **Hello** if **‘a’ value is greater than 10** or print **Hai.**



```
int a= 25
```

Assume User Gives value of ‘a’ variable as 25

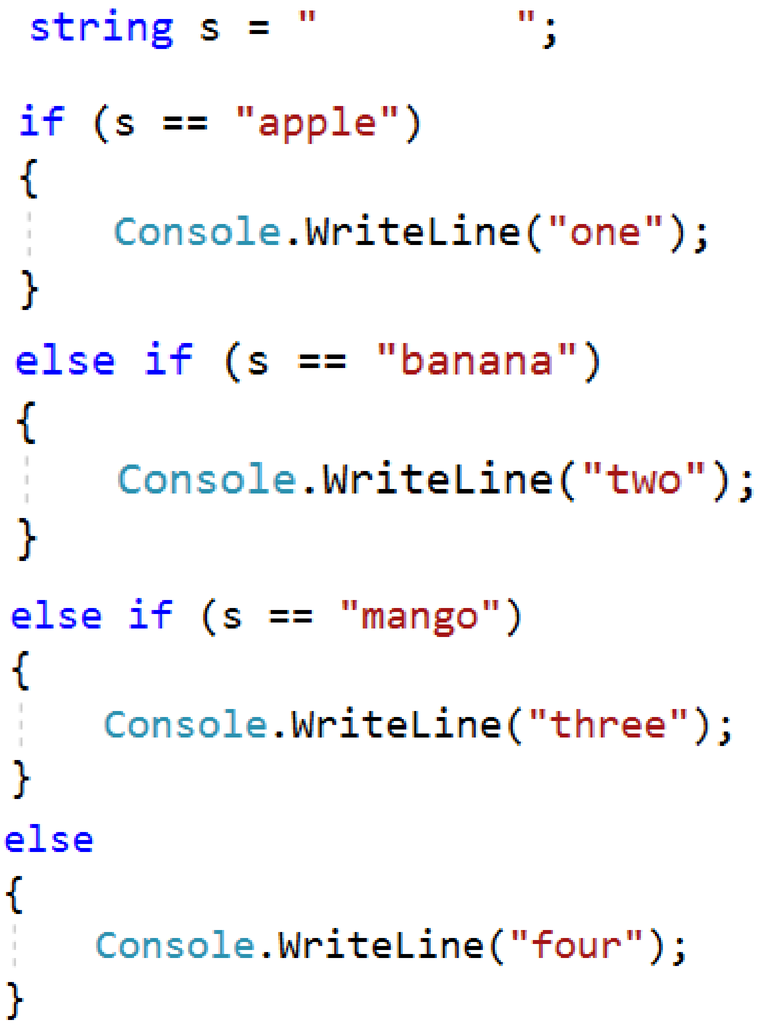
25 >10 **True**

```
if( a>10 )
{
Console.WriteLine("Hello");
}
else
{
Console.WriteLine("Hai");
}
```

OUTPUT

Hello

conditions sample 3



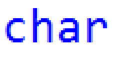
```
string s = "          ";

if (s == "apple")
{
    Console.WriteLine("one");
}
else if (s == "banana")
{
    Console.WriteLine("two");
}
else if (s == "mango")
{
    Console.WriteLine("three");
}
else
{
    Console.WriteLine("four");
}
```

print one two three…
based on fruit names

apple	one
banana	two
mango	three
……..	four

conditions sample 4

Assume I have declared a character variable



```
char c = 'B' ;
```

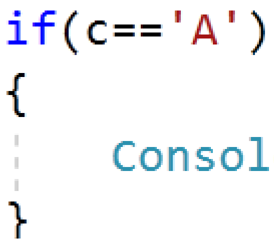
Req: If the user gives the value for the character variable as

A then print Apple

B then print Boy

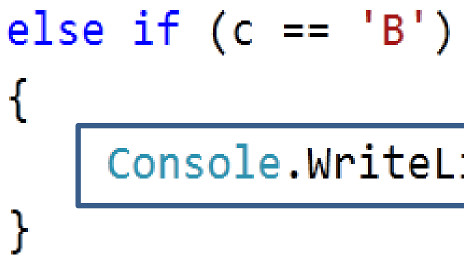
C then print Cat

If any other character then print Orange



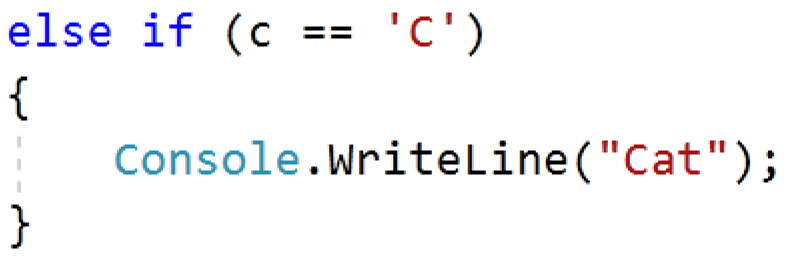
```
if(c=='A')
{
    Console.WriteLine("Apple");
}
```

False

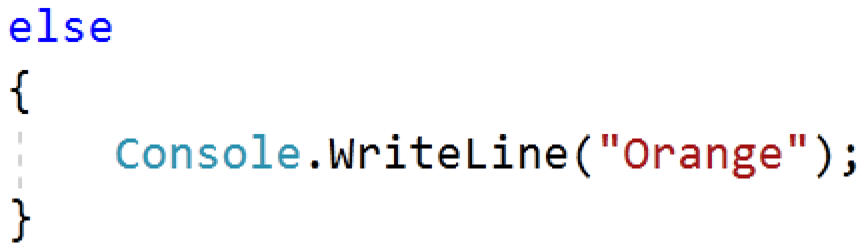


```
else if (c == 'B')
{
    Console.WriteLine("Boy");
}
```

True



```
else if (c == 'C')
{
    Console.WriteLine("Cat");
}
```



```
else
{
    Console.WriteLine("Orange");
}
```

The user has given the input as B

OUTPUT

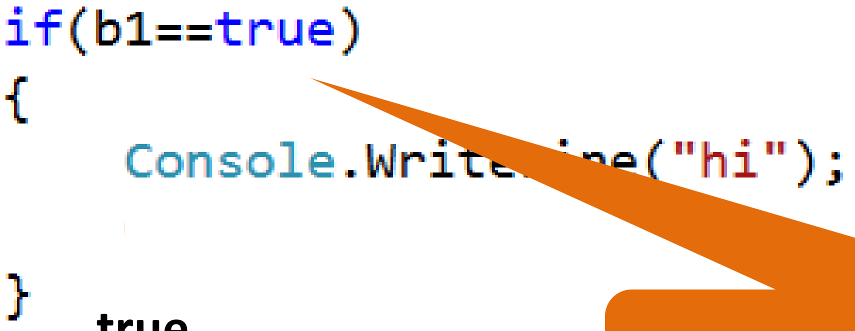
Boy

bool variable conditions part 1

Req:Assume i declared a bool variable b1, if b1 is true print hi

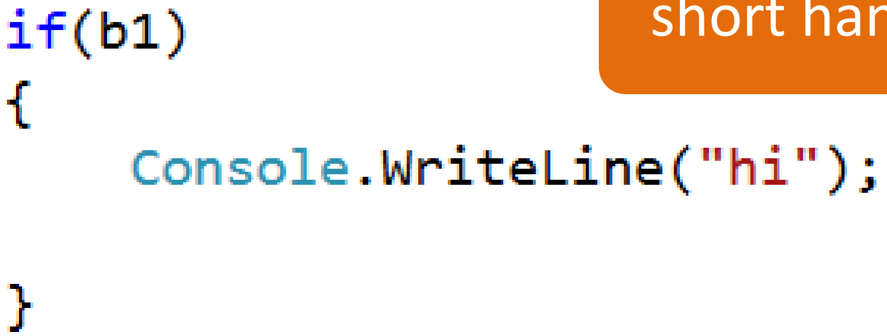
bool b1= **true**

true



```
if(b1==true)
{
    Console.WriteLine("hi");

}
```

true



```
if(b1)
{
    Console.WriteLine("hi");

}
```

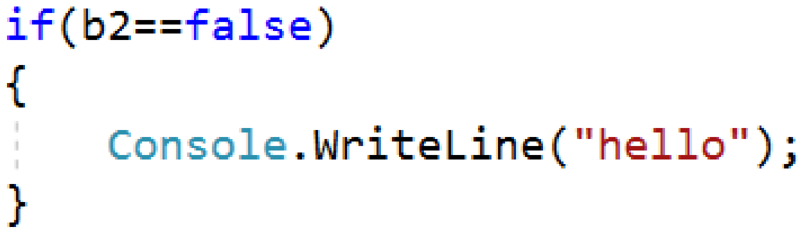
short hand way to write this code is

bool variable conditions part 2

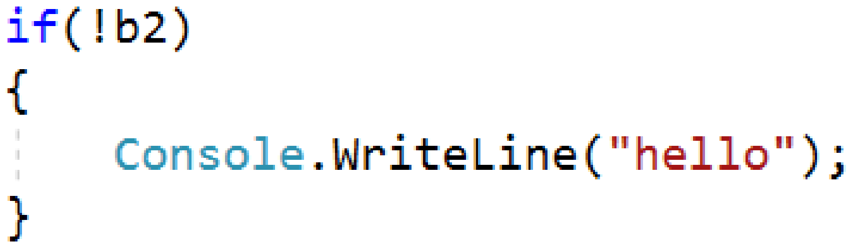
Req:Assume i declared a bool variable b2, if b2 is false print hello

bool b2= **false** **;**

false



```
if(b2==false)
{
    Console.WriteLine("hello");
}
```



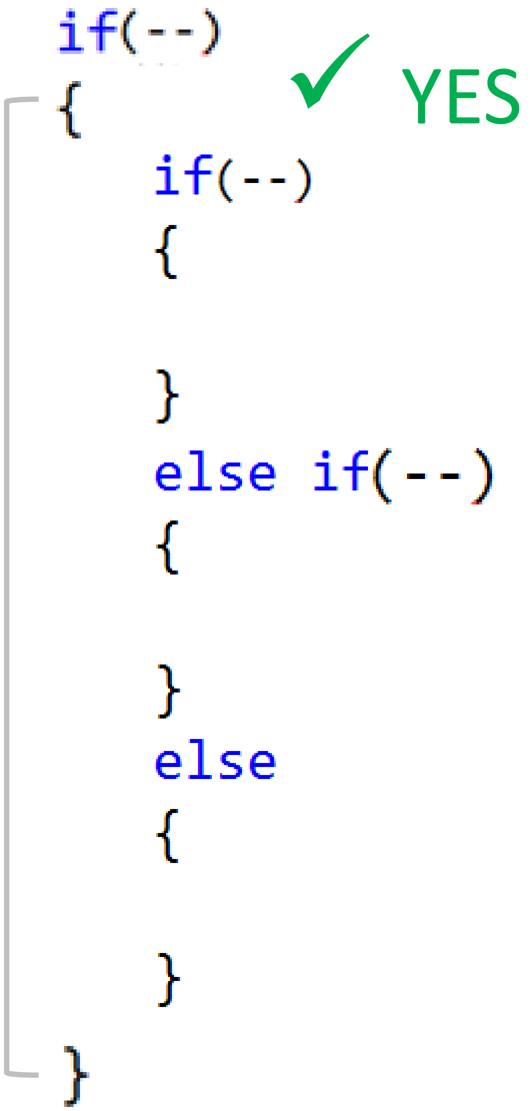
```
if(!b2)
{
    Console.WriteLine("hello");
}
```

Execute all code and do all Exercises at Home

End of DAY 7

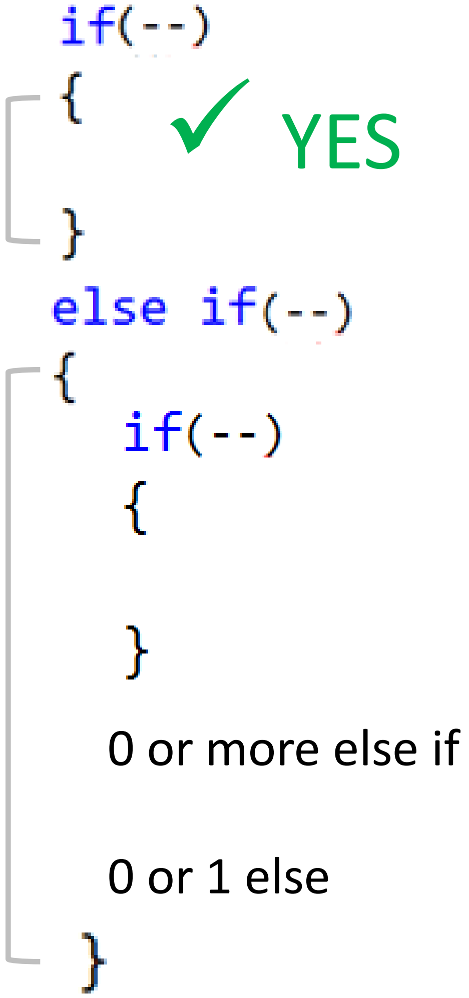
nested conditions

Is it possible to have if , else if and else statements within another if statement ? else if statement ? else statement ?



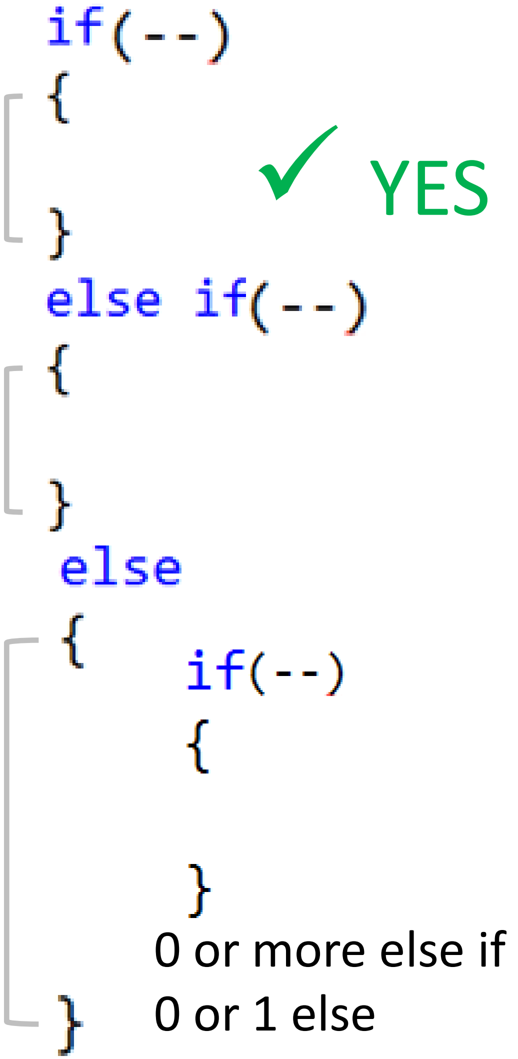
```
if(--)
{
    if(--)
    {

    }
    else if(--)
    {

    }
    else
    {

    }
}
```

✓ YES



```
if(--)
{

}
else if(--)
{
    if(--)
    {

    }
    0 or more else if

    0 or 1 else
}
```

✓ YES



```
if(--)
{

}
else if(--)
{

}
else
{
    if(--)
    {

    }
    0 or more else if
    0 or 1 else
}
```

✓ YES

and table or table

T	**&&**	**T**	**T**
F	&&	T	F
T	&&	F	F
F	&&	F	F

T	**||**	**T**	**T**
F	||	T	T
T	||	F	T
F	||	F	F

using multiple expressions in conditional statements – 1

```
If(1expression) {  ….. }
```

```
If(exp1  && exp2)
{
----c# code----
}
```

If exp1 and exp2 both are true, execute the body

Use conditional and (&&) operator

```
If(exp3  ||  exp4)
{
----c# code----
}
```

If any one of the expression is true ,execute the body

Use conditional or(||) operator

conditional statement lab

Req:

1. **Create a class named Days**
2. **create a method GetDayName in Days class**
3. **GetDayName method must take dayNo as input**
4. **GetDayName must return dayName as string**

```
public string GetDayName(int dayNo)
{
  ...your code here ...
}
```

Trainer : ask students to write code & trainer must monitor verify the same day

Note: return Monday to Sunday if values atre 1,2,..7

if any other number is passed as input return invalid day

If..elseif..else-Lab

* Create a Fruitshop class.
* Create a method GetTotalC .
* Method return type must

Trainer : ask students to write code & trainer must show the solution in the next session if more asks for solution

Conditions:

Description	If Qty Purchased	Cost
If fruit is Apple	**Qty>10**	**12**
If fruit is Apple	**Qty<=10**	**15**
If fruit is Orange	**Qty>20**	**7**
If fruit is Orange	**Qty>10 && Qty<=20**	**8**
If fruit is Orange	**Qty<=10**	**9**

switch

switch case is usually faster than series of if and else if statements.

It is better to use switch statement when more than one else if statement is present in a conditional statement.

switch syntax

Syntax:

```
   switch(existing variablename or expression)
   {
     case  predicted value1:
                  --------
                  --------
            break;
     case predicted value2:
                  --------
                  --------
                  break;
          ..........................
   .....................................
               default:
                 -------
                 -------
               break;
   }
```

create 10 case labels if we have 10 predicted values

all case & default labels must end with break;

default is compulsory for switch case.

switch statement-sample

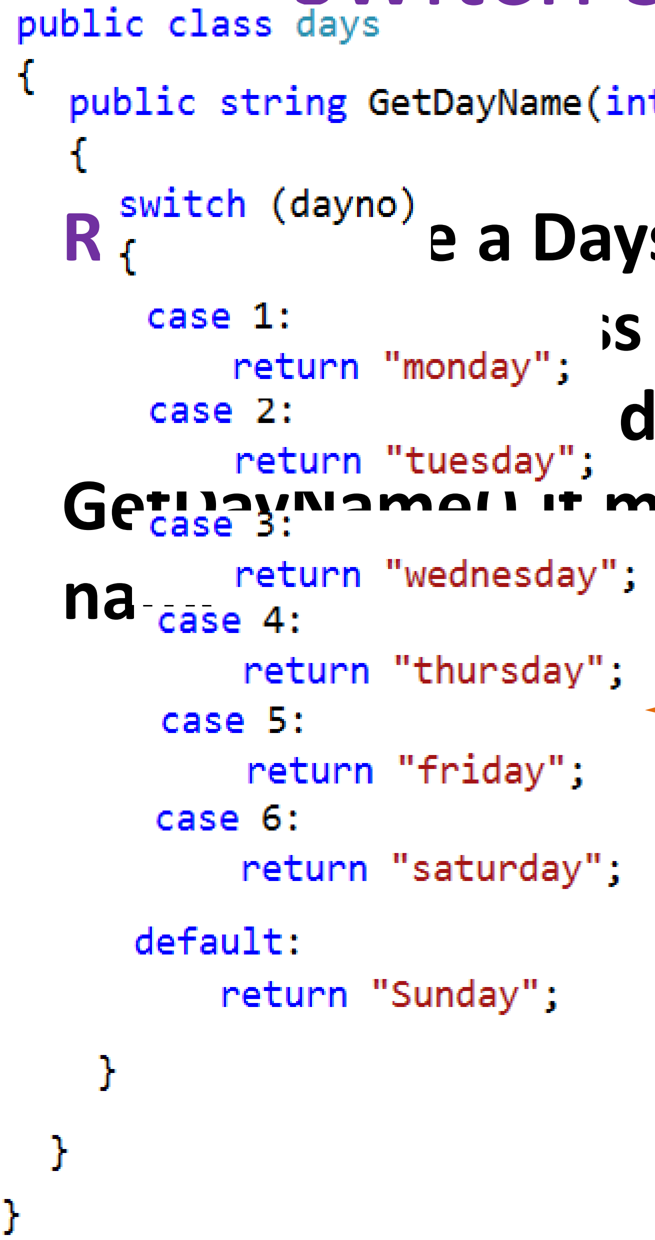
R e a Days class

s create a meth

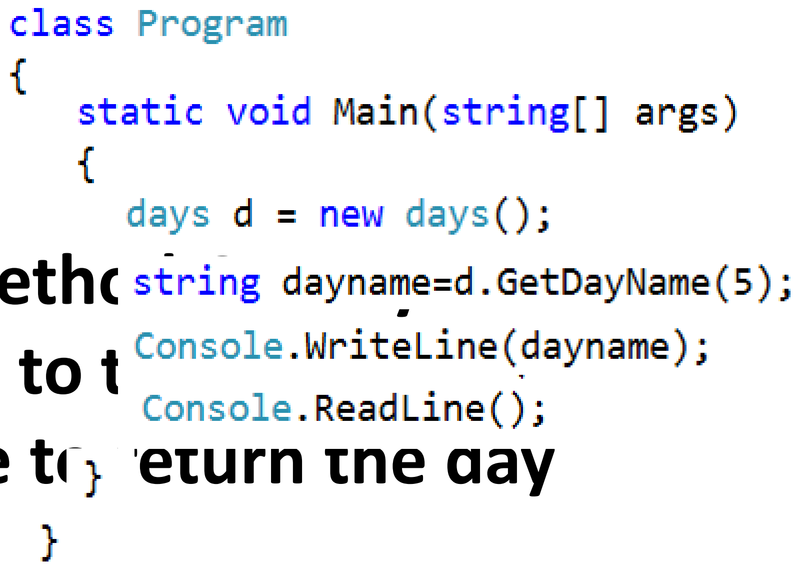
day number to t

GetDayName() it must be able to return the day

na

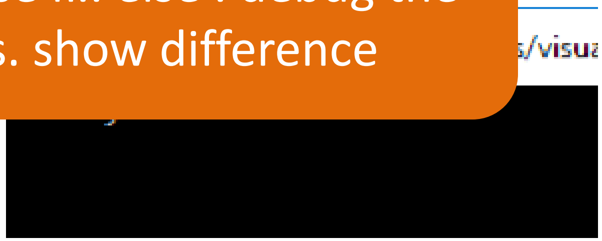


```
public class days
{
  public string GetDayName(int dayno)
  {
    switch (dayno)
    {
      case 1:
          return "monday";
      case 2:
          return "tuesday";
      case 3:
          return "wednesday";
      case 4:
          return "thursday";
      case 5:
          return "friday";
      case 6:
          return "saturday";

     default:
         return "Sunday";

    }

  }
}
```



```
class Program
{
    static void Main(string[] args)
    {
      days d = new days();
      string dayname=d.GetDayName(5);
      Console.WriteLine(dayname);
      Console.ReadLine();
    }
 }
```

Trainer: show the same code using switch & if else if.. else . debug the code in vs. show difference

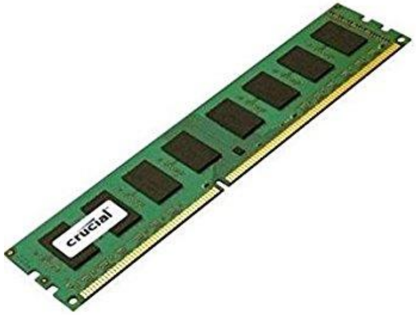


Execute all code and do all Exercises at Home

End of DAY 8

RAM Architecture

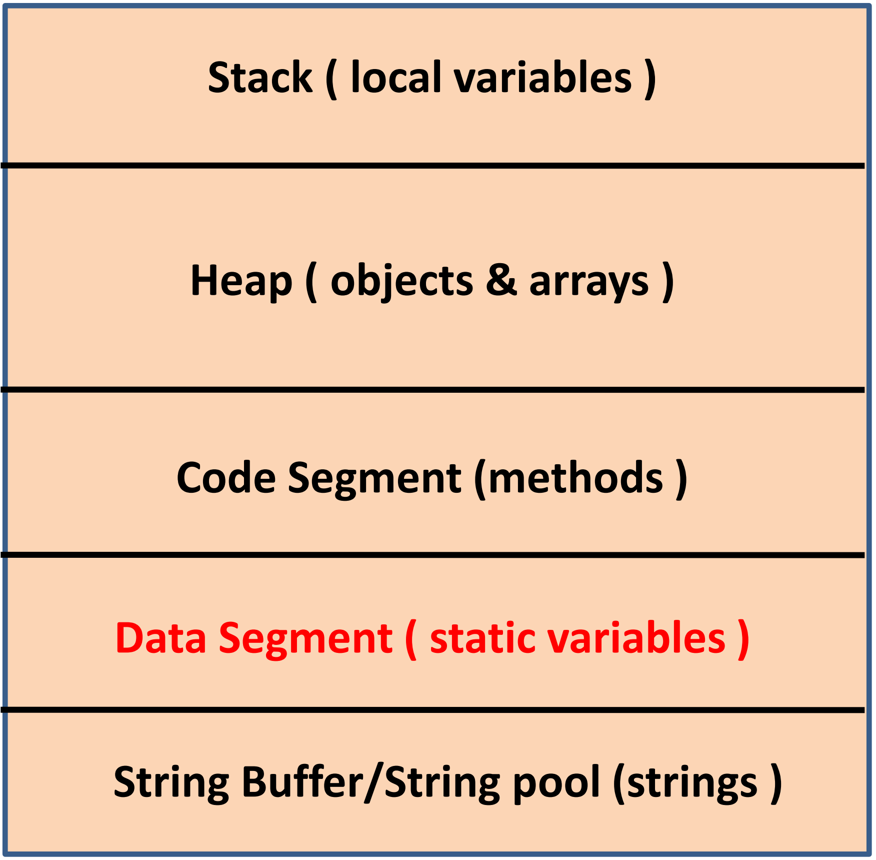
we know that all the programs are executed in RAM memory



Operating System

when we start our computer the OS will divide the RAM into 22-23 partitions

As a programmer we need to understand 4 partitions



Stack (local variables)

Heap (objects & arrays)

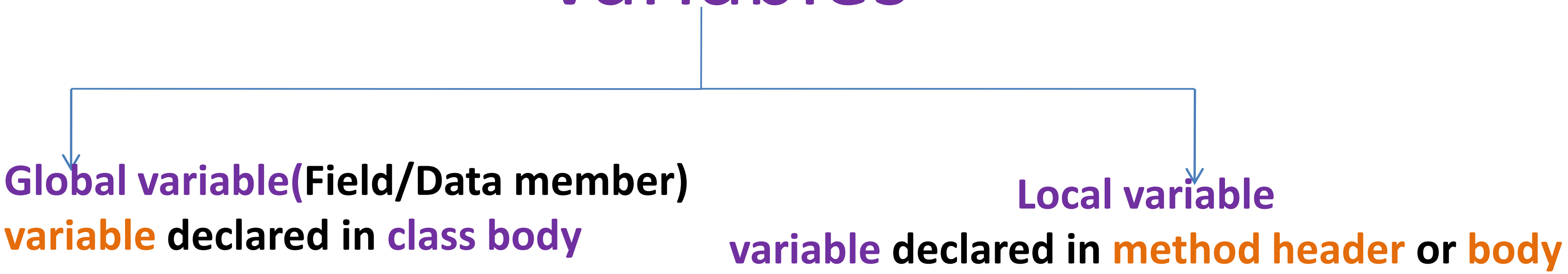
Code Segment (methods)

Data Segment (static variables)

String Buffer/String pool (strings)

RAM

variables

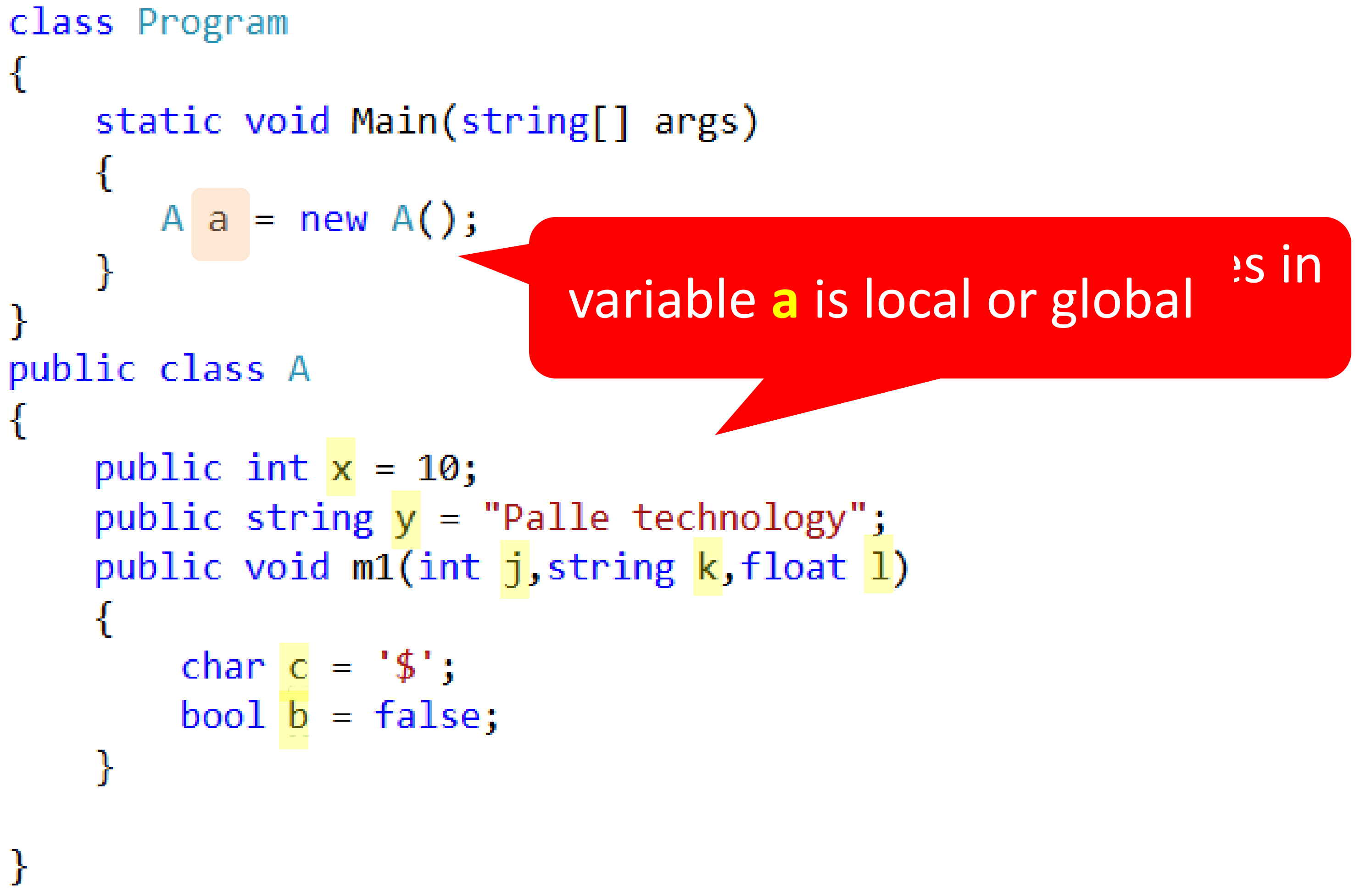


Global variable(Field/Data member)

variable declared in class body

Local variable

variable declared in method header or body



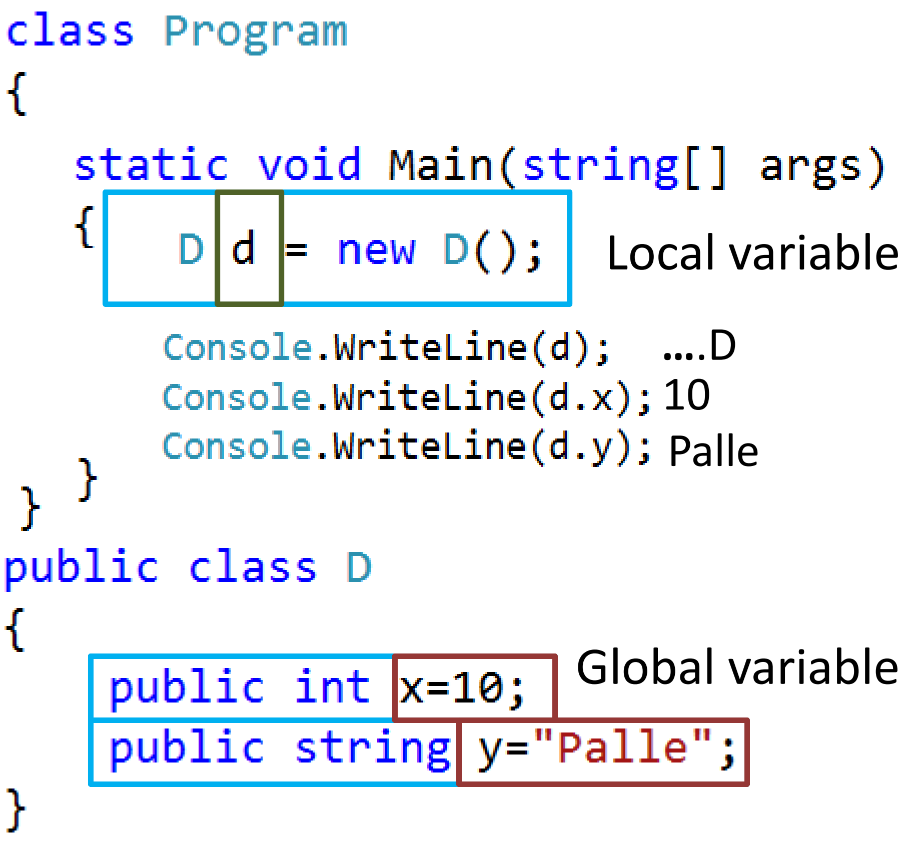
```
class Program
{
    static void Main(string[] args)
    {
        A a = new A();
    }
}
public class A
{
    public int x = 10;
    public string y = "Palle technology";
    public void m1(int j,string k,float l)
    {
        char c = '$';
        bool b = false;
    }

}
```

es in

variable **a** is local or global

memory allocation

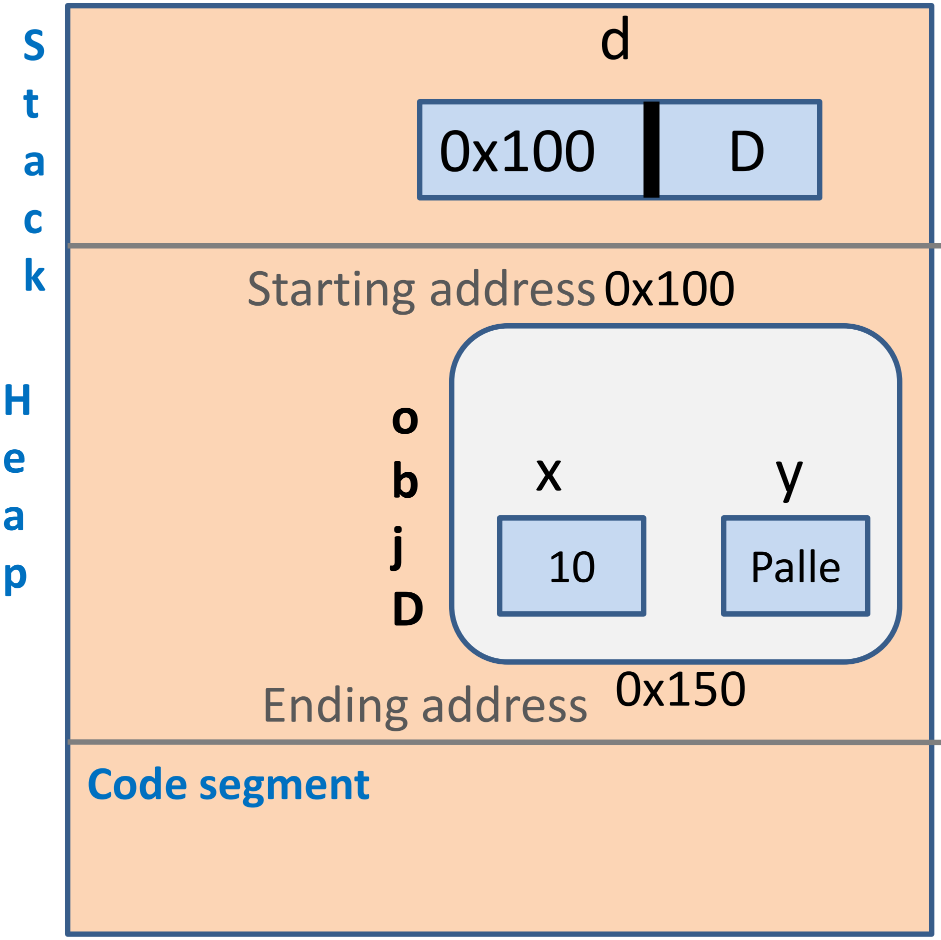
- All Local variables are stored in Stack.
- All Class Objects are created in Heap.
- All Global variables are created in Object.
- All the methods are loaded in the code segment



```
class Program
{
    static void Main(string[] args)
    {
        D d = new D();

        Console.WriteLine(d);   ....D
        Console.WriteLine(d.x); 10
        Console.WriteLine(d.y); Palle
    }
}
public class D
{
    public int x=10;
    public string y="Palle";
}
```

Local variable

Global variable



Arrays

Arrays:

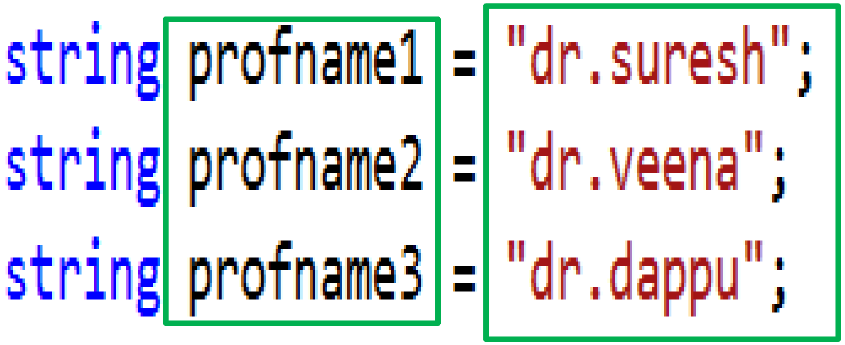
Array is a collection used for storing logically related multiple values under a single variable name

Syntax:

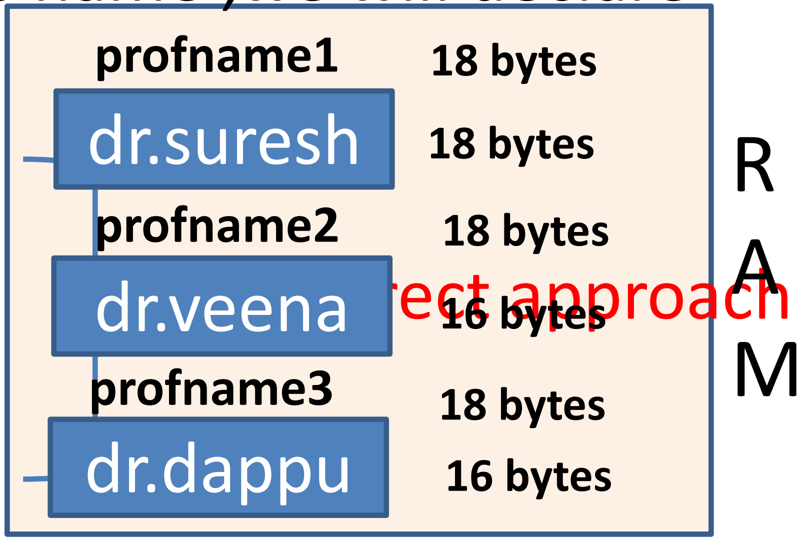
```
DT[] VN= new DT[size]{v1,v2,v3………};
```

purpose of arrays

- Using arrays we can store multiple values under a single variable name.
- Usually, to store 3 professors name ,we will declare three variables

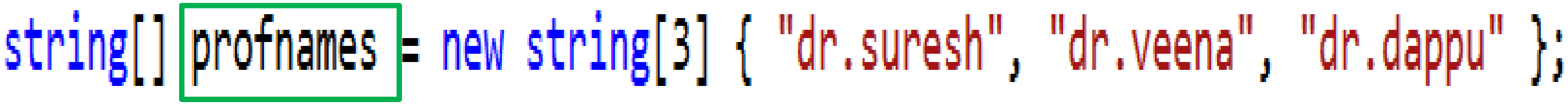


```
string profname1 = "dr.suresh";
string profname2 = "dr.veena";
string profname3 = "dr.dappu";
```



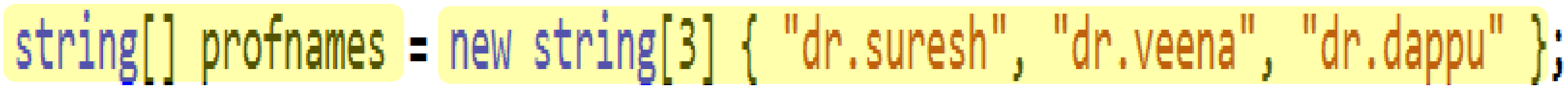
- For storing single variable name **profname1** **it requires 9*2 bytes** same way for storing all **profname variables** it takes huge memory

Using arrays

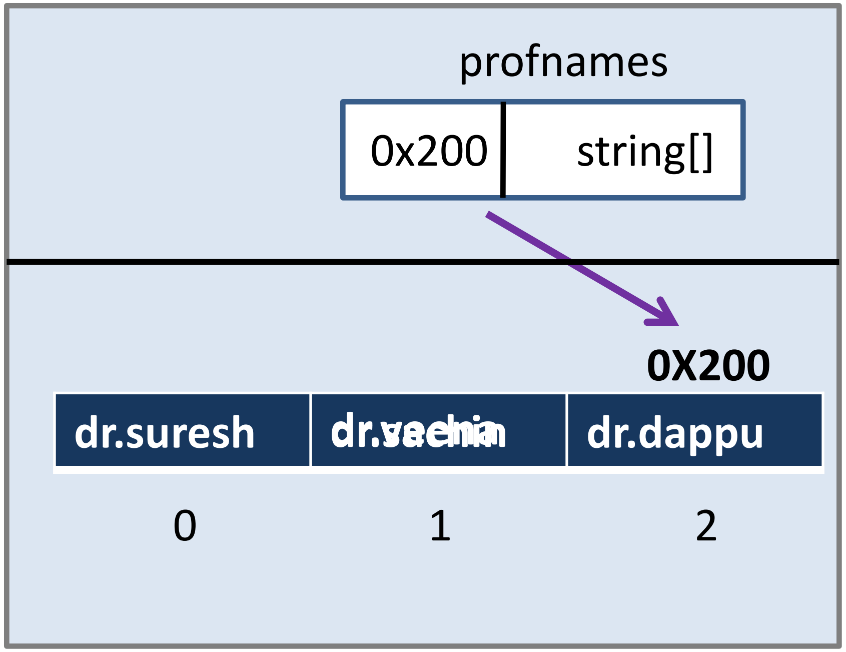


```
string[] profnames = new string[3] { "dr.suresh", "dr.veena", "dr.dappu" };
```

reading & modifying arrays data

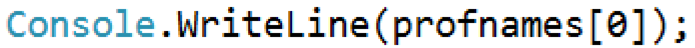


```
string[] profnames = new string[3] { "dr.suresh", "dr.veena", "dr.dappu" };
```



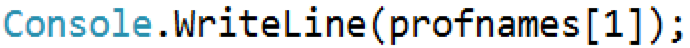
How to print data present in array??????

To retrive 1st cell data



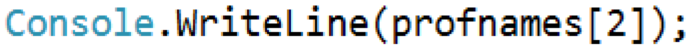
```
Console.WriteLine(profnames[0]);
```

To retrive 2nd cell data



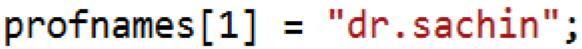
```
Console.WriteLine(profnames[1]);
```

To retrive 3rd cell data



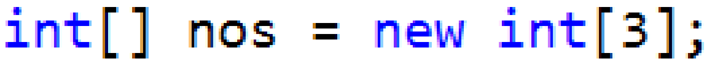
```
Console.WriteLine(profnames[2]);
```

to modify 2nd cell data:



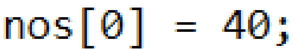
```
profnames[1] = "dr.sachin";
```

declaring empty arrays

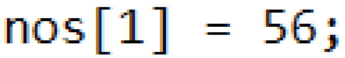


```
int[] nos = new int[3];
```

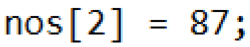
To store data in empty array



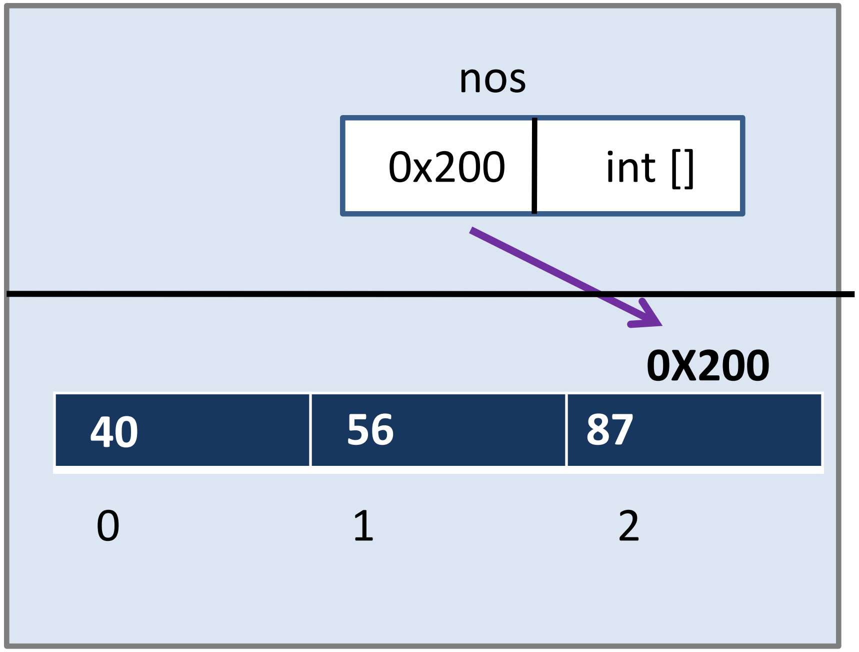
```
nos[0] = 40;
```



```
nos[1] = 56;
```



```
nos[2] = 87;
```



array assignment

1. Declare **char[]** array to store **$! # @**
2. Declare **bool[]** array and store true , false , true , false

3.Declare float[] array for storing

- 10.78f   14.678f   19.21f   7.989f

Execute all code and do all Exercises at Home

End of DAY 9

loops

loops are used for eliminating

code repetition (or) code duplication

c# supports

- for loop
- for each
- while loop
- do-while loop

- In this tutorial we will learn only for loop

for syntax

TRUE FALSE

```
for (Initialization; Condition; Increment/decrement )
 {
   repeating unit of  code
 }
```

Returns either TRUE or FALSE

Assume condition is false

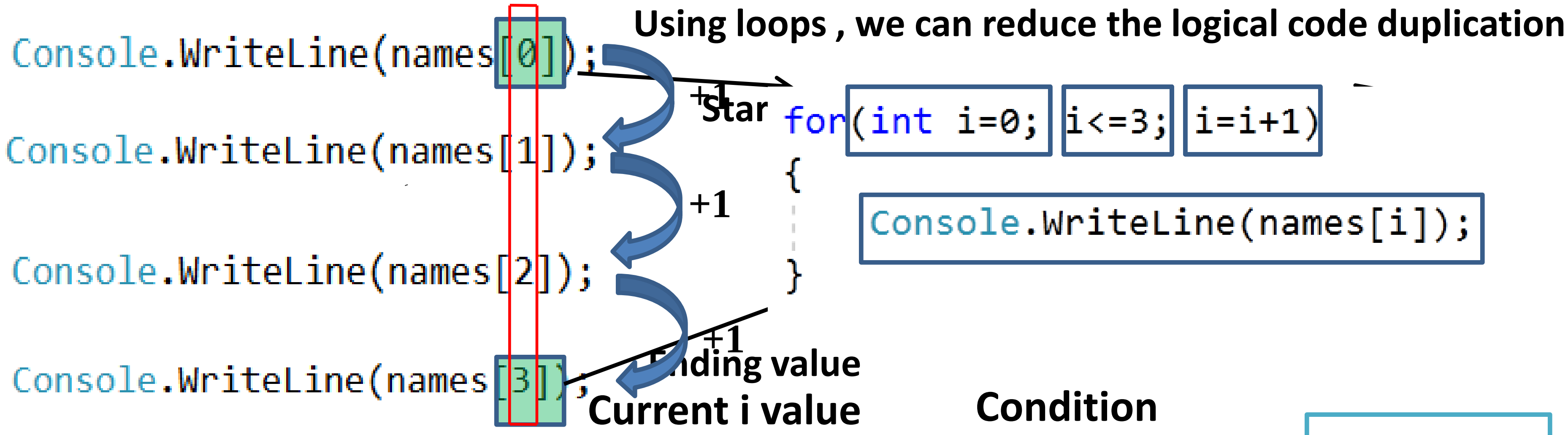
Importance of Loop

```
string[] names = new string[4] { "Raj", "Hari", "suresh", "kiran" };
```

Req: Display all items present in the array **names**

Raj	Hari	suresh	kiran
0	1	2	3

Index numbers



```
Console.WriteLine(names[0]);
Console.WriteLine(names[1]);
Console.WriteLine(names[2]);
Console.WriteLine(names[3]);
```

Using loops , we can reduce the logical code duplication

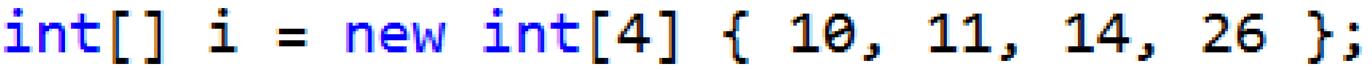
```
for(int i=0; i<=3; i=i+1)
{
    Console.WriteLine(names[i]);
}
```

Which are starting and ending val

Current i value	**Condition**	
i = 0	0<=3 T	Raj
i = 1	1<=3 T	Hari
i = 2	2<=3 T	suresh
i = 3	3<=3 T	kiran
i = 4	4<=3 F	

End of Loop

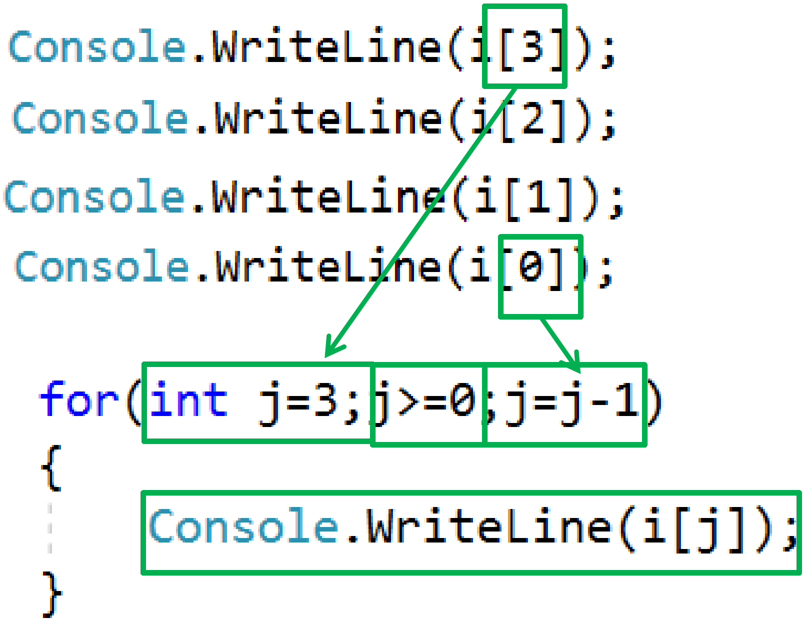
loops sample 1



```
int[] i = new int[4] { 10, 11, 14, 26 };
```

	10	11	14	26
Index numbers	0	1	2	3

Req: Display all items present in the array in reverse order



```
Console.WriteLine(i[3]);
Console.WriteLine(i[2]);
Console.WriteLine(i[1]);
Console.WriteLine(i[0]);

for(int j=3;j>=0;j=j-1)
{
    Console.WriteLine(i[j]);
}
```

Current i value	Condition	Output
j = 3	3>=0 T	26
j = 2	2>=0 T	14
j = 1	1>=0 T	11
j = 0	0>=0 T	10
j = -1	-1>=0 F	

End of Loop

loop sample 2

num

	10	7	9	5	4	100	99
Index numbers	0	1	2	3	4	5	6

Req: Display alternate array items present in the array

```
int[] num = new int[7] { 10, 7, 9, 5, 4, 100, 99 };
```

```
Console.WriteLine(num[0]);
Console.WriteLine(num[2]);
Console.WriteLine(num[4]);
Console.WriteLine(num[6]);
```

```
for( int i = 0; i <= 6; i = i + 2 )
{
    Console.WriteLine(num[i]);
}
```

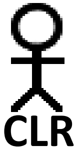
Current i value	Condition	output
i = 0	0<=6	10
i = 2	2<=6	9
i = 4	4<=6	4
i = 6	6<=6	99
i = 8	8<=6	

End of Loop

Loop sample 3

Consider this array

```
Index no    0    1    2    3    4    5    6    7    8     9
int[] x = new int[10] { 11, 22, 33, 44, 55, 66, 77, 88 ,99 ,111};
for ( int i = 1; i < 10 ; i = i+2 )
                 False
  {
    Console.WriteLine(x[i]);
    Console.WriteLine(x[i - 1]);
  } End of the Loop
     Console.WriteLine(x[1]);
                          +2
     Console.WriteLine(x[3]);
                          +2
     Console.WriteLine(x[5]);
                          +2
     Console.WriteLine(x[7]);
                          +2
     Console.WriteLine(x[9]);
```



i

```
1
3
5
7
9
11
```

Expected output:

```
22  22
11  11
44  44
33  33
66  66
55  55
88  88
77  77
111 111
99  99
```

Find the logic.

Let us forget the even numbers, just for finding the logic.

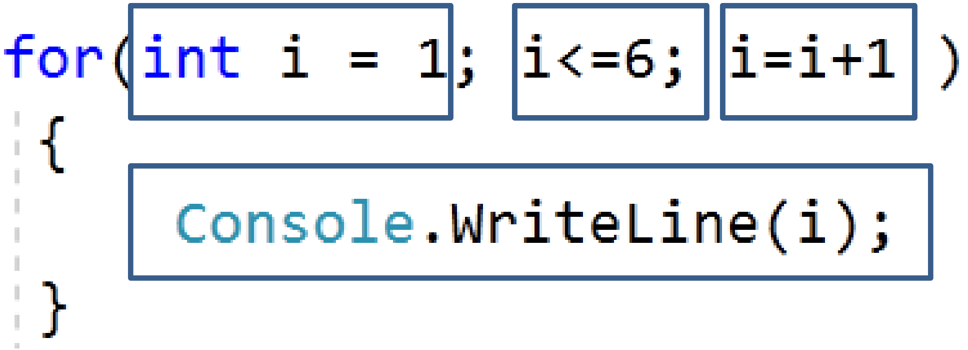
Is there any logical relation between these numbers? Yes

Which are starting and ending numbers?

How will you print the other numbers?

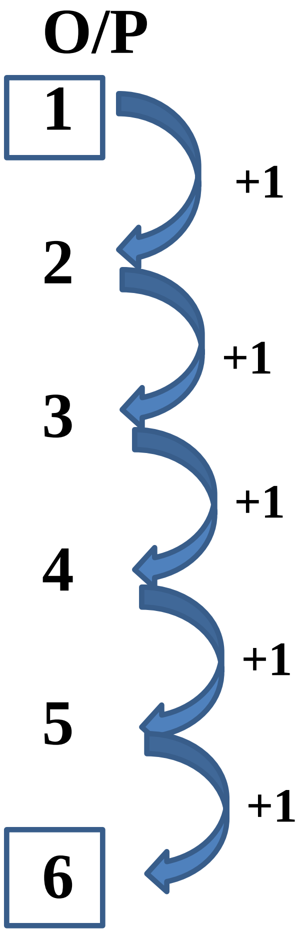
LOOPS

Req: Print the numbers like this



```
for(int i = 1; i<=6; i=i+1 )
{
    Console.WriteLine(i);
}
```

Current i value	Condition	
i = 1	1<=6 T	1
i = 2	2<=6 T	2
i = 3	3<=6 T	3
i = 4	4<=6 T	4
i = 5	5<=6 T	5
i = 6	6<=6 T	6
i = 7	7<=6 F	



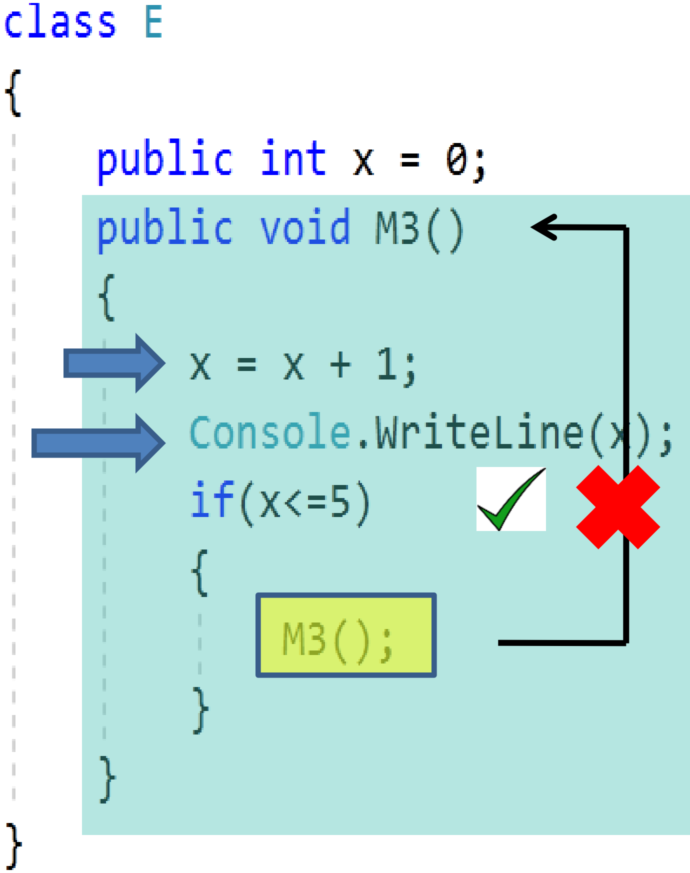
End of loop

Execute all code and do all Exercises at Home

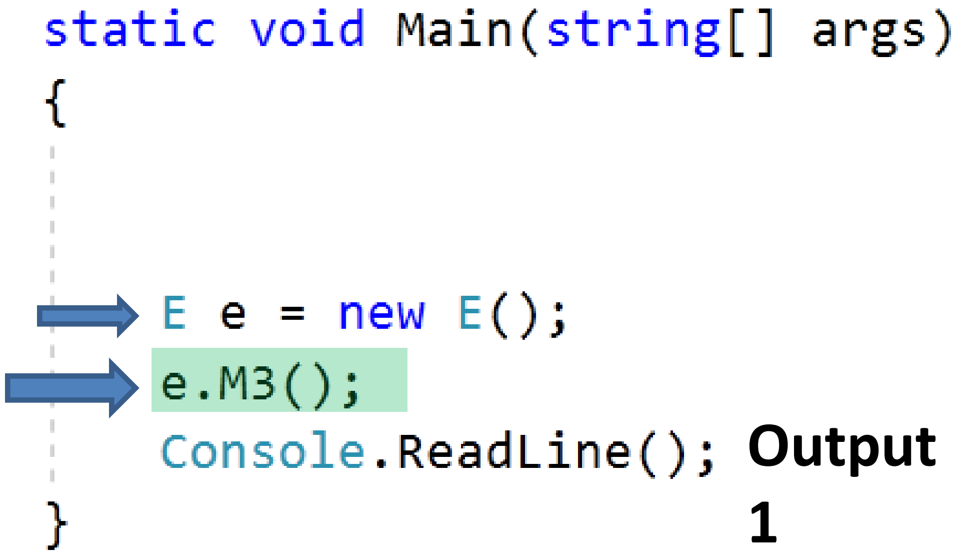
End of DAY 10

recursion

A function calling itself is called as recursion. recursion used as an alternative for loops



```
class E
{
    public int x = 0;
    public void M3()
    {
        x = x + 1;
        Console.WriteLine(x);
        if(x<=5)
        {
            M3();
        }
    }
}
```



```
static void Main(string[] args)
{
    E e = new E();
    e.M3();
    Console.ReadLine();
}
```

Output is:

1

2

3

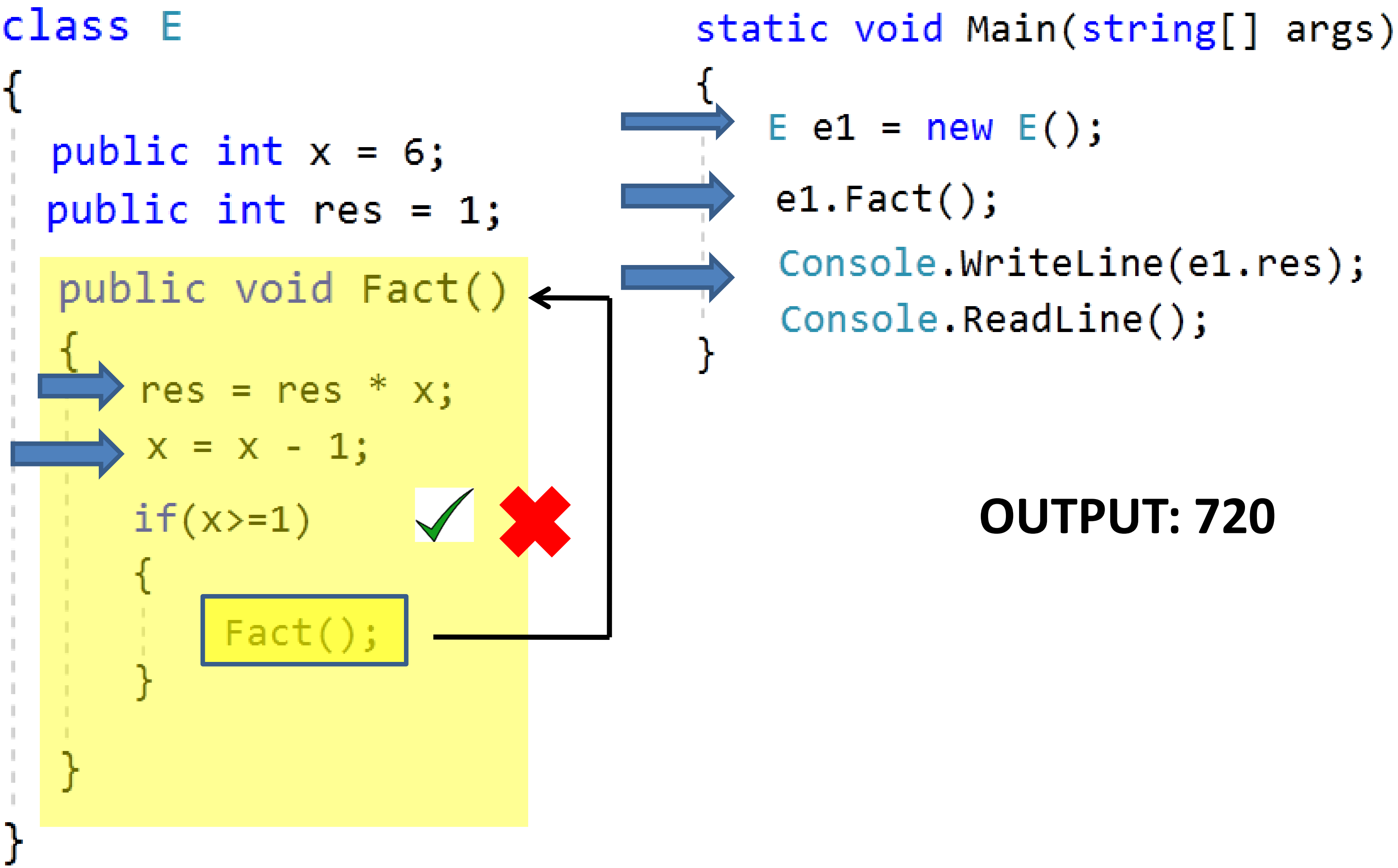
4

5

6

Recursion Assignment

Find the factorial of a given number by using recursion



```
class E
{
  public int x = 6;
  public int res = 1;
  public void Fact()
  {
      res = res * x;
      x = x - 1;
      if(x>=1)       ✓   ✖
      {
          Fact();
      }

  }
}
```

```
static void Main(string[] args)
{
    E e1 = new E();
    e1.Fact();
    Console.WriteLine(e1.res);
    Console.ReadLine();
}
```

OUTPUT: 720

pre and post Incrementation

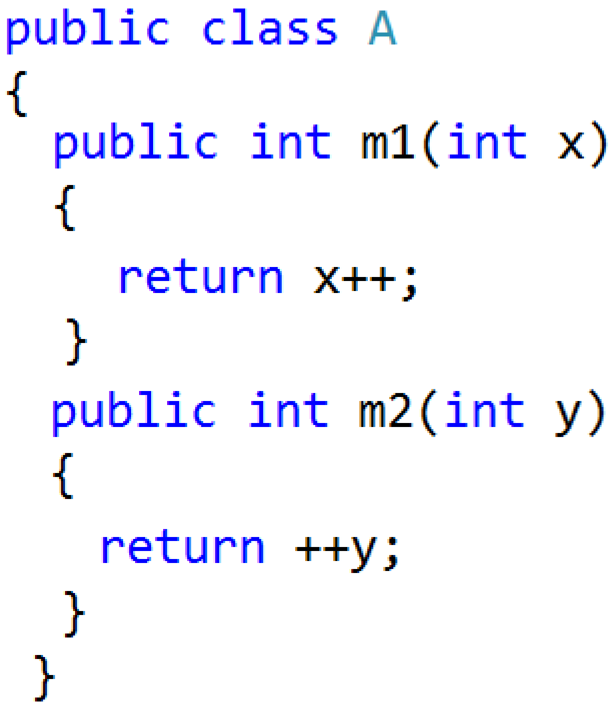
- Usually pre and post incrementation statements will work similar except in one case.
- We can observe diff between pre and post incrementation when these statements are clubbed with other statements.
- X++ → X=X+1; (Post Incrementation)
- ++Y → Y=Y+1; (Pre Incrementation)
- Pre incrementaion statement is a high priority statement.
- Post Incrementation statement is a low priority statement.

pre increment and post increment

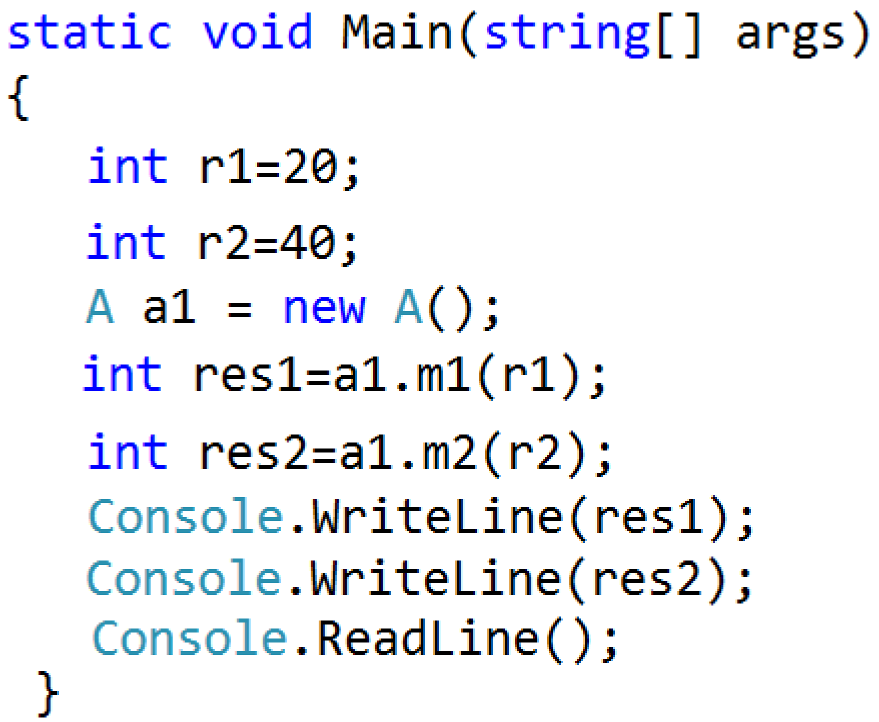
```
static void Main(string[] args)
{
    int x = 20;
    int y = 40;
     x++;
     ++y;
     Console.WriteLine(x); ?
     Console.WriteLine(y); ?
     Console.ReadLine();
 }
```

```
static void Main(string[] args)
{
  int x = 20;
  int y = 40;
  Console.WriteLine(x++);
  Console.WriteLine(++y);
  Console.ReadLine();
 }
```

Preincrement and post increment-Assignment



```
public class A
{
  public int m1(int x)
  {
     return x++;
   }
  public int m2(int y)
  {
    return ++y;
   }
 }
```



```
static void Main(string[] args)
{
    int r1=20;
    int r2=40;
    A a1 = new A();
    int res1=a1.m1(r1);
    int res2=a1.m2(r2);
    Console.WriteLine(res1);
    Console.WriteLine(res2);
    Console.ReadLine();
 }
```

What Is the output

project 1

1. Create a class with the name Billing

2. Create a method with the name GenerateBill

3. GenerateBill must take units consumed as input and return the bill based on the slab system

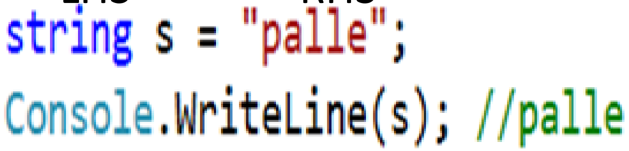
4. pass the units by taking value from console (use Console.ReadLine() for taking input)

No of units consumed	Cost per unit in rupees
0-50	5
51-150	7
151-250	12
>250	15

strings

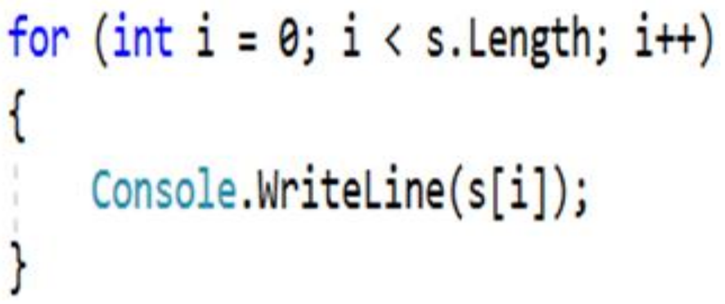
- strings are considered as character arrays and also immutable entities(whose content is not changeable)
- strings are always stored in string buffer

LHS RHS



```
string s = "palle";
Console.WriteLine(s); //palle
```

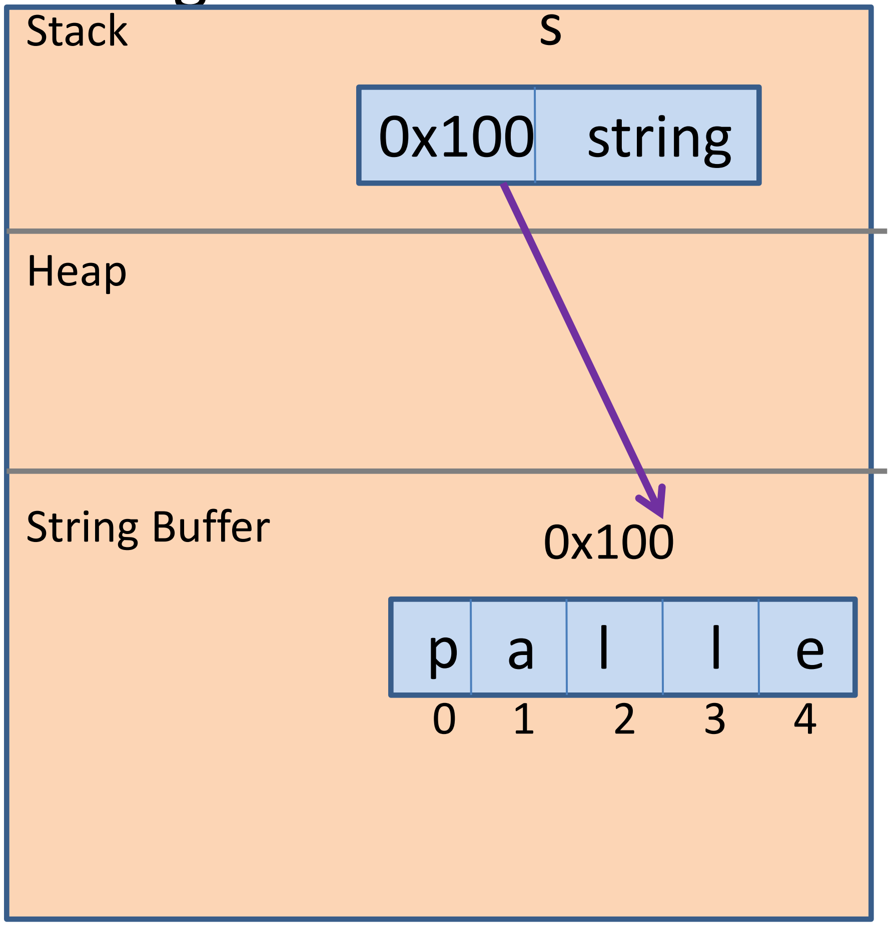
Req: I want to print each character in string



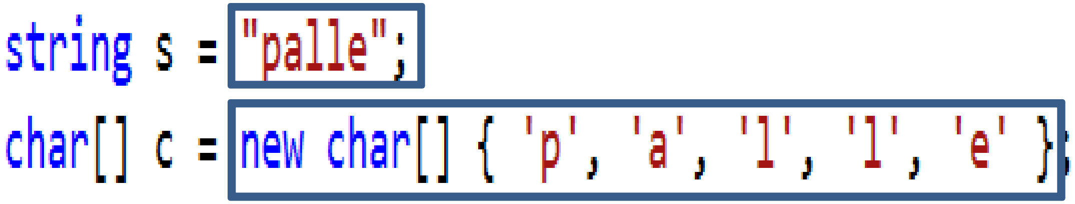
```
for (int i = 0; i < s.Length; i++)
{
    Console.WriteLine(s[i]);
}
```

p
a
l
l
e

output



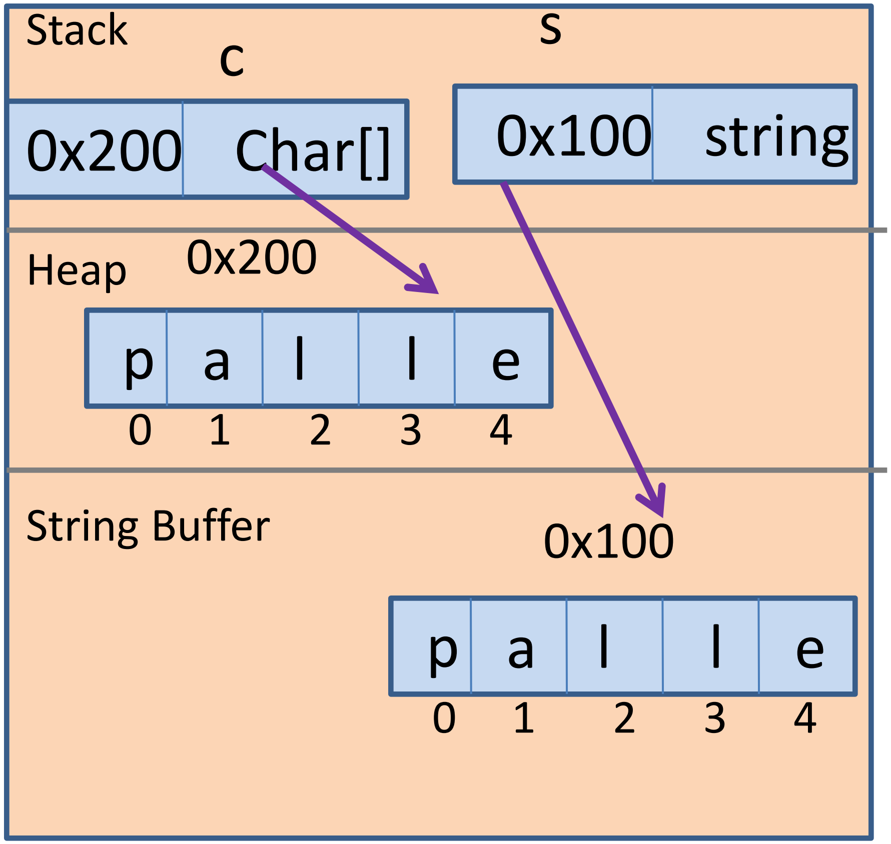
difference between string and character array



```
string s = "palle";
char[] c = new char[] { 'p', 'a', 'l', 'l', 'e' };
```

s[1]='Z'; ✗

c[1]='Z'; ?



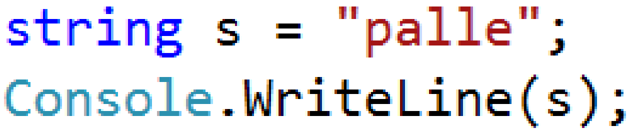
String rules

Rules while declaring strings in c#

string s="___________";

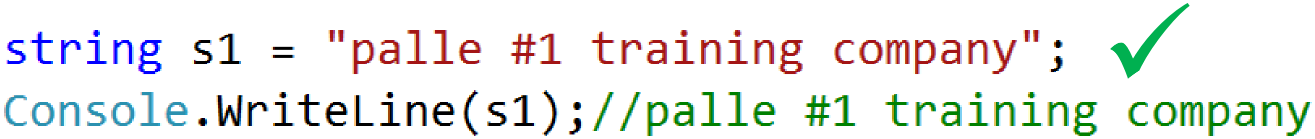
English char,numbers,special char,escape char/except non escape char

Few string samples:



```
string s = "palle";
Console.WriteLine(s);
```

✓



```
string s1 = "palle #1 training company";
Console.WriteLine(s1);//palle #1 training company
```

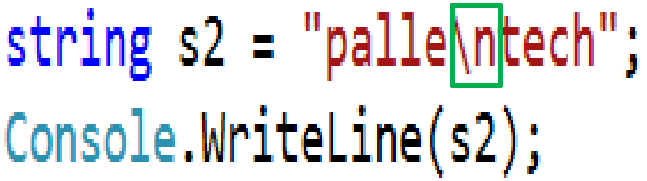
✓

escape characters in c#

Escape chars	descriptions/meaning
\a	Bell alert sound
\t	Horizontal tab(5 spaces)
\n	For print in new line
\’	‘
\”	“
\?	?
\\	\

We will see the effect of escape characters while printing the data

escape characters samples

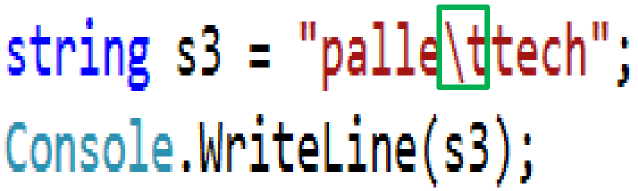


```
string s2 = "palle\ntech";
Console.WriteLine(s2);
```

Output:

palle

tech

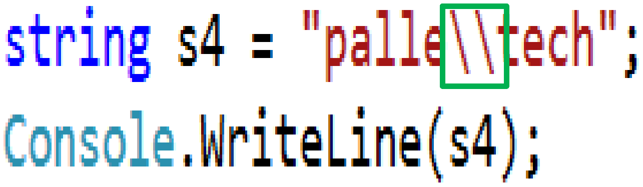


```
string s3 = "palle\ttech";
Console.WriteLine(s3);
```

Output:

palle tech

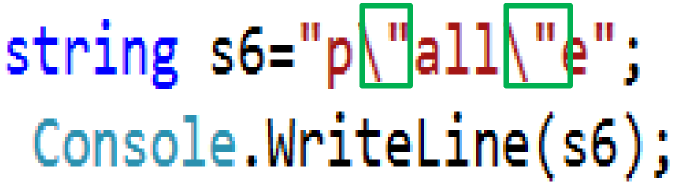
5 spaces



```
string s4 = "palle\\tech";
Console.WriteLine(s4);
```

Output:

palle\tech



```
string s6="p\"all\"e";
 Console.WriteLine(s6);
```

Output:

p”all”e

verbatim string(@)

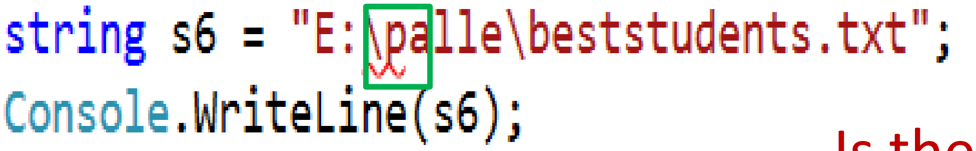
1.String starting with **@** is known as verbatim string ,

2.all char present in double quotes are treated as normal char in case of verbatim strings

Req:I want to print a path

Why I am getting error

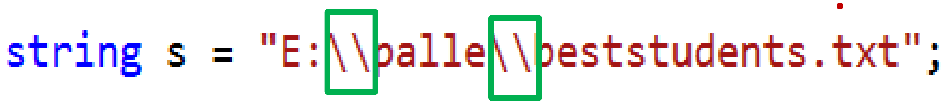
Since **\p** is not escape char



```
string s6 = "E:\palle\beststudents.txt";
Console.WriteLine(s6);
```

Is there any way to print path as it

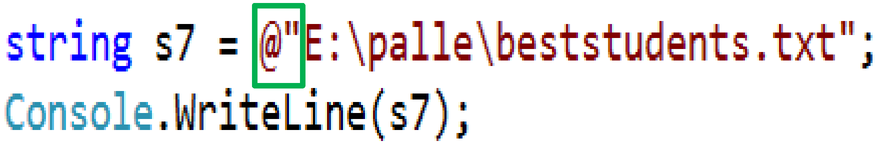
.



```
string s = "E:\\palle\\beststudents.txt";
```

Is there any way to print path as it is

Using @ before string,all char are treated as normal char



```
string s7 = @"E:\palle\beststudents.txt";
Console.WriteLine(s7);
```

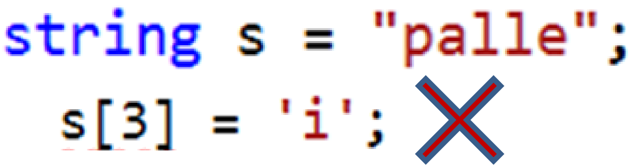
Output:

E:\palle\beststudents.txt

strings and immutability

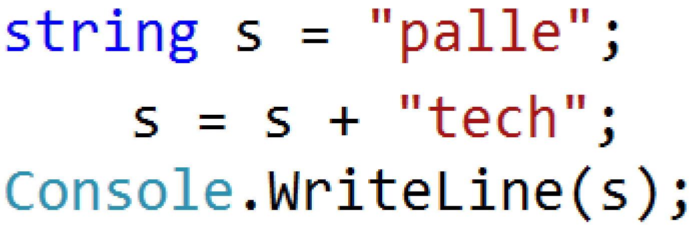
- Strings are considered as immutable entities(whose content is not changeable) since they are stored in string buffer.

LHS RHS

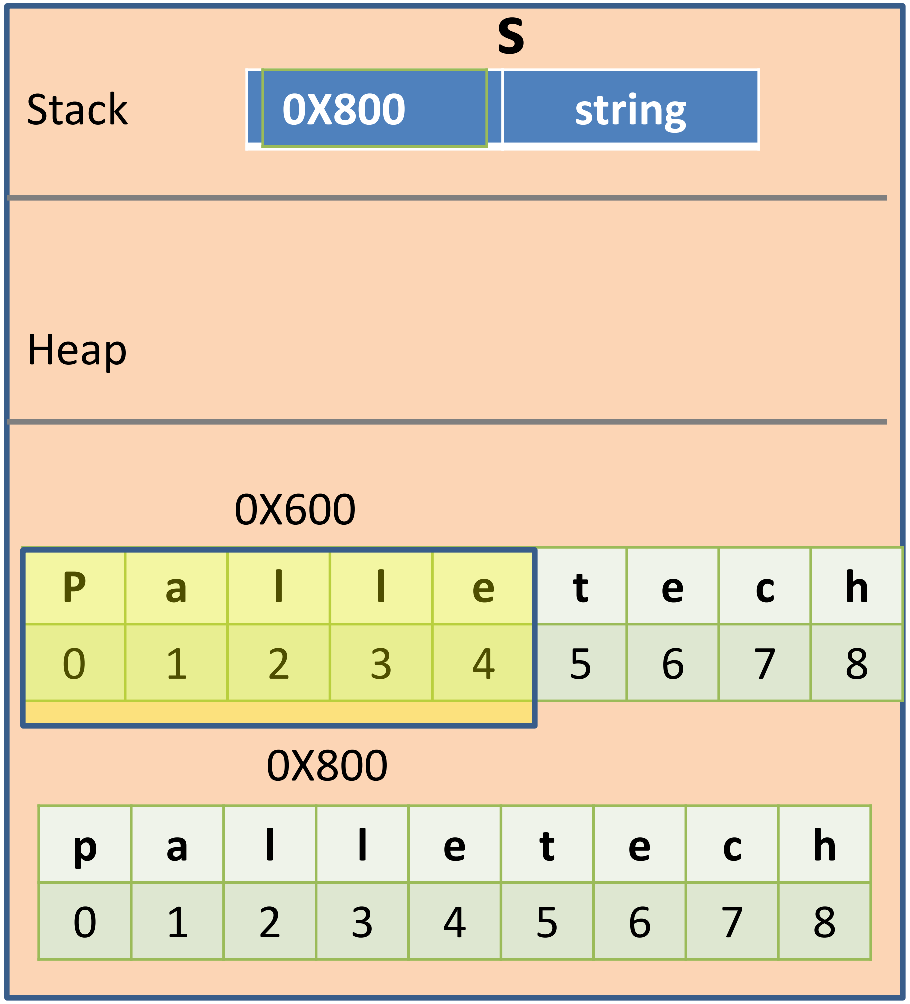


```
string s = "palle";
  s[3] = 'i'; ✗
```

Req:I want to add new string to existing string



```
string s = "palle";
     s = s + "tech";
Console.WriteLine(s);
```



P	a	l	l	e	t	e	c	h
0	1	2	3	4	5	6	7	8

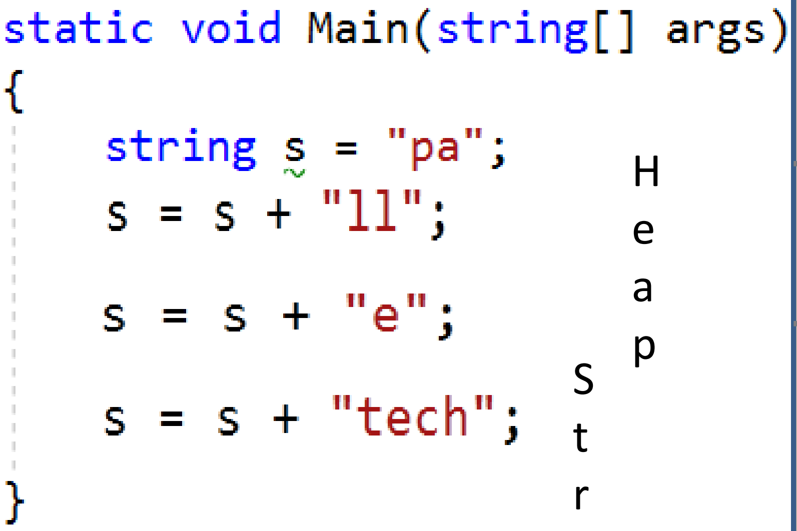
p	a	l	l	e	t	e	c	h
0	1	2	3	4	5	6	7	8

strings & immutability assignment

Consider I have declared a string variable like this

RAM

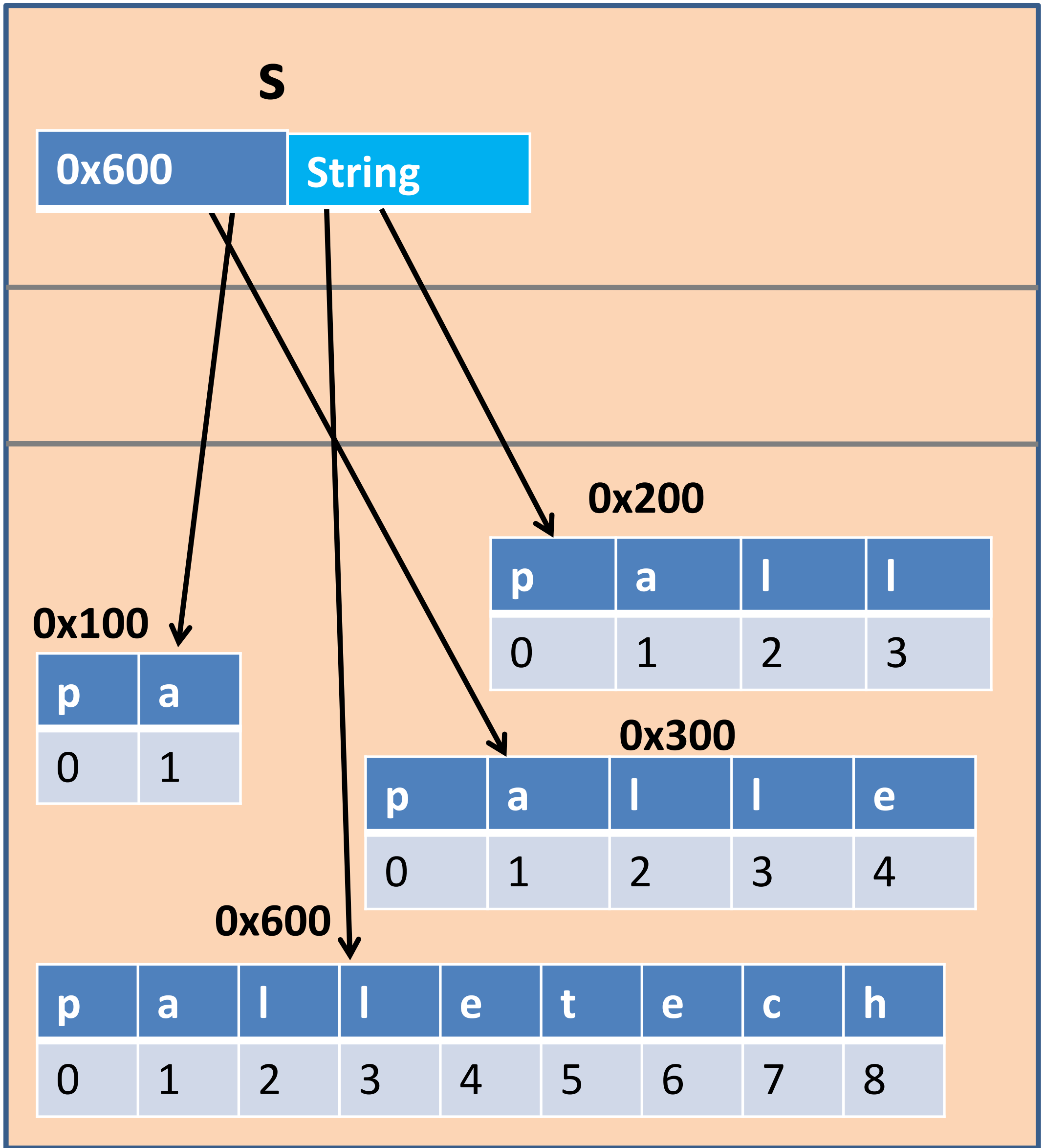
Stack



```
static void Main(string[] args)
{
    string s = "pa";
    s = s + "ll";

    s = s + "e";

    s = s + "tech";
}
```

Heap

StrIngBuffer



p	a
0	1

p	a	l	l
0	1	2	3

p	a	l	l	e
0	1	2	3	4

p	a	l	l	e	t	e	c	h
0	1	2	3	4	5	6	7	8

Execute all code and do all Exercises at Home

End of DAY 11