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Department of Electrical & Computer Engineering

ECE 150 *Fundamentals of Programming*

Identifiers

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Outline

- In this presentation, we will:
 - Define identifiers and their purpose
 - Reviewing some of the identifiers we have already seen
 - Discussing case sensitivity
 - Describing naming conventions
 - Define
 - Reserved identifiers
 - Keywords

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Identifiers

- Apart from literals, we have seen words that appear to refer to something, either an action or some other property:
`int main std cout endl return`
- Such symbols are called *identifiers*—they are used to allow the programmer to refer to a specific means of storage or operations on data

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Identifiers

- Each identifier can have a different significance

Identifier	Description
<code>int</code>	A type, a standardized means of storing and manipulating data
<code>main</code>	The name of a function
<code>std</code>	A <i>namespace</i> ; specifically all identifiers in the standard library are within the <code>std</code> namespace and must be referred to using <code>std::</code>
<code>cout</code>	An object (a data structure) in the standard library that allows printing to the console or standard output
<code>endl</code>	An object in the standard library that is used to indicate that we are at the end of a line and we should continue on the next
<code>return</code>	An indication of the value to be returned from a function



Identifiers

- Any combination of underscores, letters and numbers where the first character is not a number can be used as an identifier
- Whitespace and other symbols cannot be used
- Identifiers are *case sensitive*, so the identifiers `a0` and `A0` are as different (to the compiler) as the identifiers `Charles_Babbage` and `Ada_Countess_of_Lovelace`
- Identifiers will be used to refer to data and to operations on data
 - At all times, we will try to use descriptive identifiers
 - What does the data represent?
 - What does the function do?



Identifiers

- We can describe the format of identifiers using regular expressions:

`[_A-Za-z][_A-Za-z0-9]*`

Required: an underscore or a letter

Zero or more additional
underscores, letters or digits



Naming conventions

- Often, identifiers, once a reasonable name has been chosen, will follow some sort of *naming convention*
 - We will use *snake-case*:
`Linked_list` `is_sorted` `array_capacity`
 - Programming languages like Java use *camel-case*:
`LinkedList` `IsSorted` `arrayCapacity`
 - Some use *juxtaposition*:
`linkedlist` `issorted` `arraycapacity`



Naming conventions

- There is a special place reserved for you in hell if you use just an underscore as an identifier...

```
#include <stdio.h>
main(int t,int _,char*a){return!0<t?<3?main(-79,-13,a+main(-87,1-_,main(-86,0,a+1)+a)):1,t<_?main(t+1,_,a):3,main(-94,-27+t,a)&&t==2?_<13?main(2,_,1,"%s %d\n"):9:16:t<0?<-72?main(,t,"@n'+,#/*}{w+/w#cdnr/+,}{r/*de)+,/*{*+,/w{%/+,\w#q#n+,\#{1+,/n{n+,\/+##n+,\/#;#q#n+,\/+k#;*,/'r : 'd*'3,}{w+K w'K:'+'e#;dq#l q#+'d'K#!\k#;q# 'r)eKK#w'r)eKK[nl]'#;#q#n'}{#w'}{[nl]'#+#n';d}rw' i;# ) [nl] /n(n#'; r(\#w'r nc[nl]'#{1,+ 'K {rw' iK;{[nl]'/w#q#n'w' nw' iwK{KK[nl]!/w{%l#w#w' i; :{nl]}'/*(q# 'ld;r'}{nlwb!/*de)'c ; ;{nl-' }rw]'/+,##*' *nc,' #nw]'/+kd'+e);+;#rdq#w! \nr'/' )}{r1# '{n' '}'#'+)##(!/!"):t<-50? ==*a?putchar(31[a]):main(-65,_,a+1):main>(*a=='/')+t,_,a+1):0<t?main(2,2,"%S"):a=='/' ||main(0,main(-61,*a,"!ek;dc i\@bK'(q)-[w]*#n+r3#1,){:\nuwloca-0;m .vpbks,fxntdCeghiry"),a+1);}
```





Reserved identifiers

- Some identifiers are reserved for use by the compiler:
 - Never define an identifier starting with an underscore
_name
 - Never define an identifier with two adjacent underscores
ECE__150
- If you do use such reserved identifiers, your code
 - May work,
 - It may not, or
 - It will work now, but will stop working with the next compiler update



Keywords

- Some identifiers are reserved by the programming language to identify specific features within the language
 - These *keywords* can never be used for any other purpose whatsoever
 - We have seen two keywords: `int` and `return`
 - The identifier `main` is not a keyword—after all, we've defined this function to do something rather boring...
- There are approximately 100 keywords in the C++ programming language
 - We will see about 30 of these throughout this course



Summary

- After this lesson, you now
 - Understand what an identifier is
 - Understand the concept of case sensitivity
 - Are aware that there are
 - Reserved identifiers, and
 - Keywords



References

- [1] Wikipedia,
https://en.wikipedia.org/wiki/Identifier#In_computer_languages
- [2] C++ reference
<https://en.cppreference.com/w/cpp/language/identifiers>



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Colophon

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The photographs of lilacs in bloom appearing on the title slide and accenting the top of each other slide were taken at the Royal Botanical Gardens on May 27, 2018 by Douglas Wilhelm Harder. Please see

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