

CISC 1110 (CIS 1.5)

Introduction to Programming Using C++

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Agenda

- Hello World
- Psuedocode
- Software Development Life Cycle
- Variables & declaration statements
- Assignment statements
- Displaying output

Our First Program

```
/*  
 * helloWorld.cpp  
 *  
 * This program demonstrates output from a C++  
 * application.  
 *  
 */  
  
#include <iostream>  
  
using namespace std;  
  
int main() {  
    cout << "Hello world!\n";  
  
    return 0;  
}
```

Comments

```
/*  
.  
.  
.  
*/
```

- Multi-line comment

```
/*  
    Name: K. Auyeung  
    Class: CISC1110  
    Assignment: #1  
*/
```

- Single line comment

```
// Finds the square of two numbers
```

Program Header

```
#include <iostream>

using namespace std;

int main()
.
.
.
```

- Any line that begins with '#' is an instruction to the compiler
- `#include` tells the compiler include the functions in the header file `iostream.h`

Program Header Continued

```
#include <iostream>

using namespace std;

int main()
.
.
.
```

- Namespaces allow to group entities like classes, objects, and functions under a name. All the files in the C++ standard library declare all of its entities within the `std` namespace. That is why we have generally included the `<using namespace std;>` statement in all programs that used any entity defined in `iostream`.
- `int main()` is the main program header, every program must have a main function

The Body

```
{  
    // Anything within the curly braces is considered part of the  
    // program body  
  
    return 0; // statements after the return are not executed  
}
```

Basic Structure of a C++ Program

```
/*  
.  
.  
.  
*/  
  
#include <iostream>  
  
using namespace std;  

```

Pseudocode

- Problem solving tool
- Intermediate step between English and programming language
- Is a combination of English and programming statements that describe how the program will solve a particular problem

Basic Rules for Psuedocode

1. Write only one stmt per line (i.e. read, output, calculate etc)
2. Indent to show hierarchy
3. End multiline structures
4. Keep statement language independent

Sample Psuedocode

Get year born

Calculate age

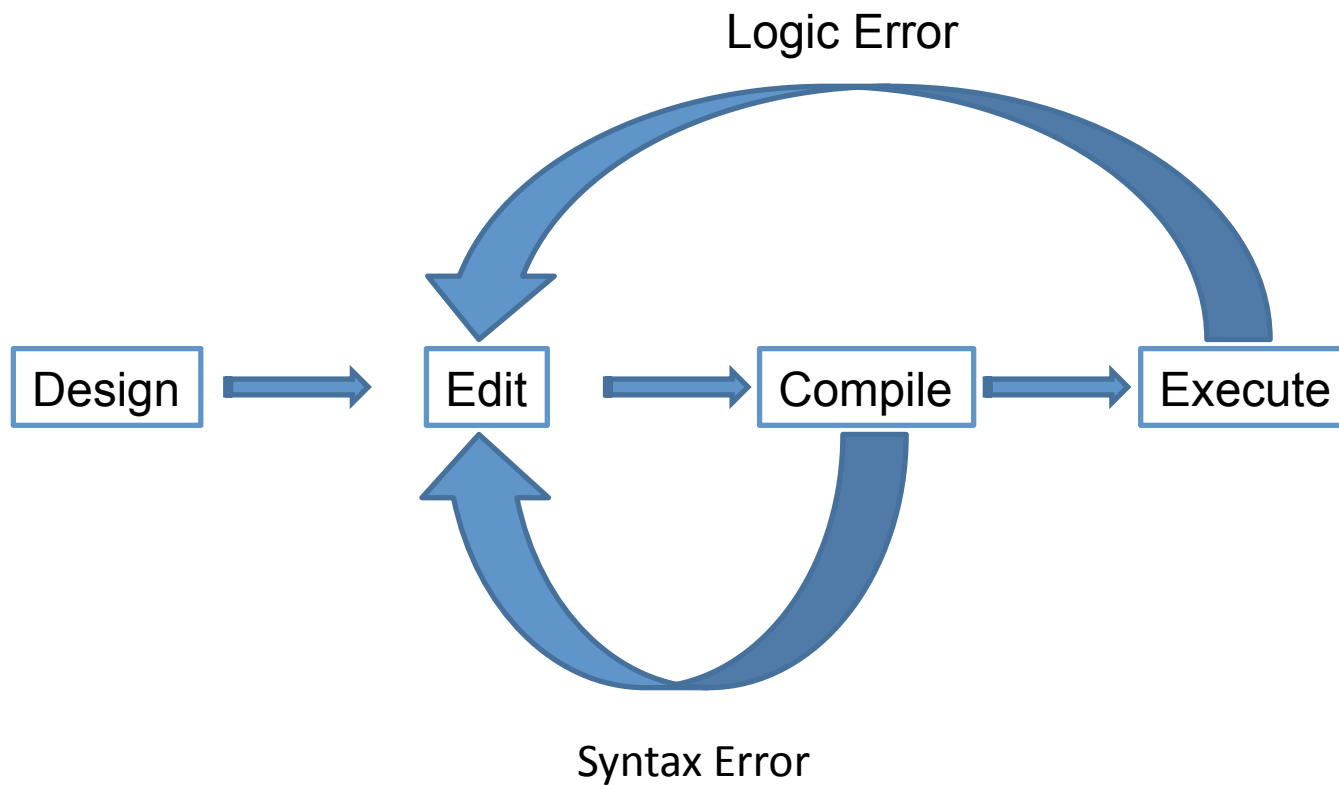
If age > 65 then

 Display "Apply discount"

Else

 Display "No discount for you"

Software Development Life Cycle



Variables and Declaration Statements

- A Variable is a name given to a memory location
- `0x9FFF:000F` vs `age`
- A declaration statement defines the properties of a variable or function
- Can only hold 1 value at a time

```
int number, sqnumber;
```

- Reserves 4 bytes for an integer value (maximum value of 2^{32})

Declarations Continued

```
char aLetter;
```

- Reserves 1 byte (8 bits) for a character value
- Can hold a value from 0 to 255

Partial ASCII Table

Dec	Hx	Oct	Html	Chr	Dec	Hx	Oct	Html	Chr
64	40	100	@	@	96	60	140	`	`
65	41	101	A	A	97	61	141	a	a
66	42	102	B	B	98	62	142	b	b
67	43	103	C	C	99	63	143	c	c
68	44	104	D	D	100	64	144	d	d
69	45	105	E	E	101	65	145	e	e
70	46	106	F	F	102	66	146	f	f
71	47	107	G	G	103	67	147	g	g
72	48	110	H	H	104	68	150	h	h
73	49	111	I	I	105	69	151	i	i
74	4A	112	J	J	106	6A	152	j	j
75	4B	113	K	K	107	6B	153	k	k
76	4C	114	L	L	108	6C	154	l	l
77	4D	115	M	M	109	6D	155	m	m
78	4E	116	N	N	110	6E	156	n	n
79	4F	117	O	O	111	6F	157	o	o
80	50	120	P	P	112	70	160	p	p
81	51	121	Q	Q	113	71	161	q	q
82	52	122	R	R	114	72	162	r	r
83	53	123	S	S	115	73	163	s	s
84	54	124	T	T	116	74	164	t	t
85	55	125	U	U	117	75	165	u	u
86	56	126	V	V	118	76	166	v	v
87	57	127	W	W	119	77	167	w	w
88	58	130	X	X	120	78	170	x	x
89	59	131	Y	Y	121	79	171	y	y
90	5A	132	Z	Z	122	7A	172	z	z
91	5B	133	[[123	7B	173	{	{
92	5C	134	\	\	124	7C	174	|	
93	5D	135]]	125	7D	175	}	}
94	5E	136	^	^	126	7E	176	~	~
95	5F	137	_	_	127	7F	177		DEL

Valid Variable/Identifier Names

- Letters, either lowercase or uppercase
- The digits 0 through 9
- The underscore ‘_’
- Variable names must begin with a letter
- Variable can begin with ‘_’ but then they may conflict with compiler specific keywords
- Variables cannot match any *reserved keywords* of the C++ language

asm, auto, bool, break, case, catch, char, class, const, const_cast, continue, default, delete, do, double, dynamic_cast, else, enum, explicit, export, extern, false, float, for, friend, goto, if, inline, int, long, mutable, namespace, new, operator, private, protected, public, register, reinterpret_cast, return, short, signed, sizeof, static, static_cast, struct, switch, template, this, throw, true, try, typedef, typeid, typename, union, unsigned, using, virtual, void, volatile, wchar_t, while

Assignment Statements

- Stores a value at the address associated with a variable name

variable_name = expression ;

- Examples

```
price = cost;
```

```
price = cost + (0.08 * cost);
```

```
price = 4.89;
```

Displaying Output

- `cout` is an object of class `ostream` that represents the standard output stream.
- By default, most systems have their standard output set to the console
- We write characters to it using the insertion operator (`ostream::operator <<`)

```
cout << ... << ... << ... ;
```

- **Examples**

```
cout << "hello world" << endl;
```

```
cout << price + 1 << endl;
```

```
cout << "Price before tax " << price << "    Price after tax " << price * 1.0825;
```

a.

```
#include <iostream>

using namespace std;

int main()
{
    int x, y;

    y = 7;
    x = y + 1;

    cout << x << " " << y << endl;

    y = y + 6;

    x = 5;

    cout << x << " " << y << endl;

    return 0;
}
```

b.

```
#include <iostream>

using namespace std;

Int main()
{
    int number, sqnumber;

    number = 3;

    sqnumber = number * number;

    cout << number << " "
         << sqnumber
         << sqnumber * sqnumber
         << endl;

    return 0;
}
```