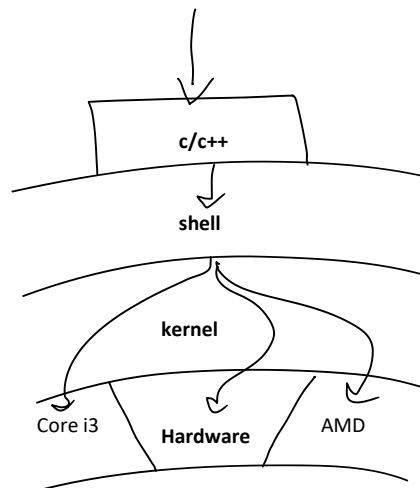


TIME & SPACE COMPLEXITY

Thursday, October 26, 2023 10:15 AM

MACHINE DEPENDENT

Shell receives the command
Here whenever there is a change in a h/w , the code has to be rewritten. e.g. Device drivers. If we have installed a specific printer, then the corresponding printer(hp) , then the corresponding driver to be installed. I case we change the printer to some other company(wipro), then the wipro drive needs to be installed



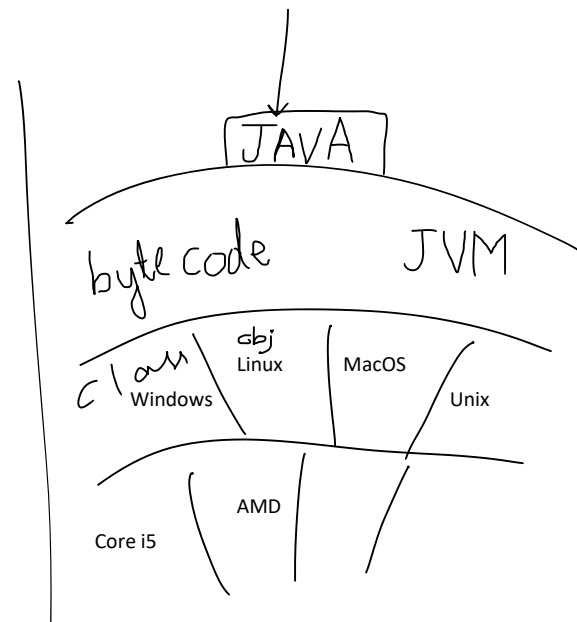
Machine independence Or Platform dependence

In this case , the os acts as a intermediate layer between application and the machine for example a c/c++ compiler.

It converts the source code to os Understandable code(Object code).

The object code is received by the kernel which further gets converted to the underlying hardware format.

But if we change the os, then the same object code will not work for example, If the object code is created for windows , then the same object code will not run on Linux.



Platform independence

Here above the os, one more layer is added , which is a virtual machine. e.g. in case of java, JVM is installed for every Operating System.

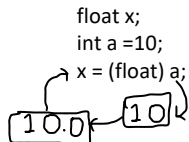
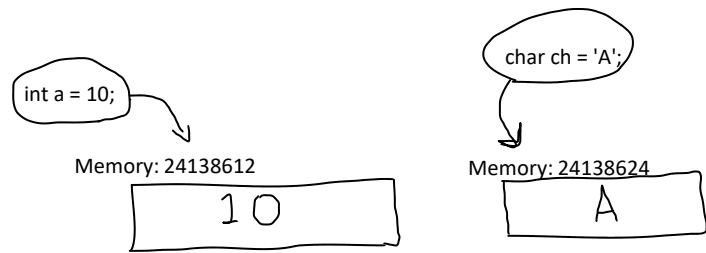
A java compiler converts the source code to byte code which is commonly understandable by all JVMs across OS.

JVM will convert the byte code to object code based on the underlying operating system and operating system is further going to take care of the hardware

Components of a program

Monday, October 30, 2023 9:55 AM

- **Variable:** A variable is a named memory location able of holding value of a specific type that may change at the run time.



Symbol Table

a	24138612
ch	24138624

- **Symbol table:** Symbol table is a data structure create maintained and used by the compiler to manage identifiers. It is removed/dropped once compilation is over.

Once we create a variable, its name, address, datatype cannot be changed. (Because the identifiers are replaced by the address constants)

add.c

```
int a = 10, b = 20, c;  
c = a + b;
```

0	L 1 a
4	A 1 b
8	ST 1 c
12	a DC '10
16	b DC '20
20	c DS 'F

Symbol table

a	12
b	16
c	20

Created during compilation in memory. Then removed

0	L 1 12
4	A 1 16
8	ST 1 20
12	10
16	20
20	

Compile Time

add.obj → add.exe
\$./a.out

Base register: 900

908
916

30
~~ST 1 920~~
~~20~~

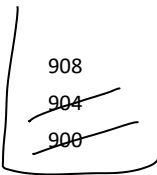
Base register: 900

900	L 1 912
904	A 1 916
908	ST 1 920
912	10
916	20
920	

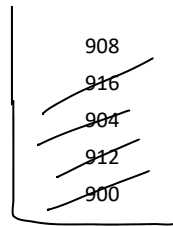
Entries in register:



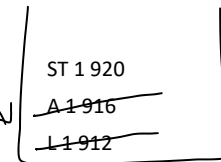
Instruction Counter /
Location Counter



Memory Address Register
(MAR)

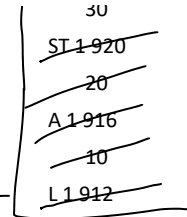


Instruction Register
(IR)



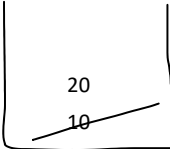
Memory Buffer Register
(MBR)

Data



Instruction

Working Register
(WR)



DATATYPES

Thursday, November 2, 2023 10:04 AM

Datatypes: It defines the properties of a data like size, range, representation and operations that can be performed

Primary Built-in Scalar Fundamental Primitive	Derived Vector	Secondary User-defined
1) char 2) int 3) float 4) double These types are built-in to the compiler. Any object/variable /data structure that we use in a program fundamentally is comprised to basic types. There are also called SCALAR variable of a scalar type can hold maximum one data at a time.	1) arrays 2) pointer These types can't exist on their own, in order to get declared they use either primary or secondary type. int a[10]; / char c[20]; char *p; int *ptr; student *pt; These are also called vectors as multiple elements can be accessed using these types.	1) struct 2) union 3) enum A user defined/ secondary type is a collection of predefined and/or derived types to represent real life entity. Ex: struct student { int regno; char nm[20]; int sem; char br[10]; float cgpa; };

char:

Character set: It is the list of characters legal to a language with the equivalent numeric values.
 e.g. ASCII(C89 & C99), UNICODE(C99)

Standards of c:

C79 - K&R c
 C89 - ANSI c
 C99 -

AMERICAN STANDARD CODE FOR INFORMATION INTERCHANGE(ASCII)

A → 65

Total char: 256(0-255)

Languages covered: English, Latin

UNIVERSAL CODING (UNICODE):

mapping of characters different human languages with their respective numeric value. e.g. Indian language: ISCII etc.

~~Insert~~
~~CAPS Lock~~
~~Num lock~~
~~Scroll lock~~
 not a character

CDAC

created

INDIAN STANDARD
 CODE FOR
 INFORMATION
 INTERCHANGE(ISCII)

Translation: exact meaning

Transliteration: exact meaning with same feelings

Unicode
 _tmain(){
 char ch;
 }
 2Byte

ASCII
 main(){
 char ch;
 }
 1Byte