Grade-7 Computer Notes

COMPUTER LANGUAGES

```
                  Programming Languaes
                   /                \
                  /                  \
            Low Level              High Level
            /      \              /     |      \
           /        \            /      |       \
       First      Second     Third    Fourth    Fifth
    Generation  Generation Generation Generation Generation
```
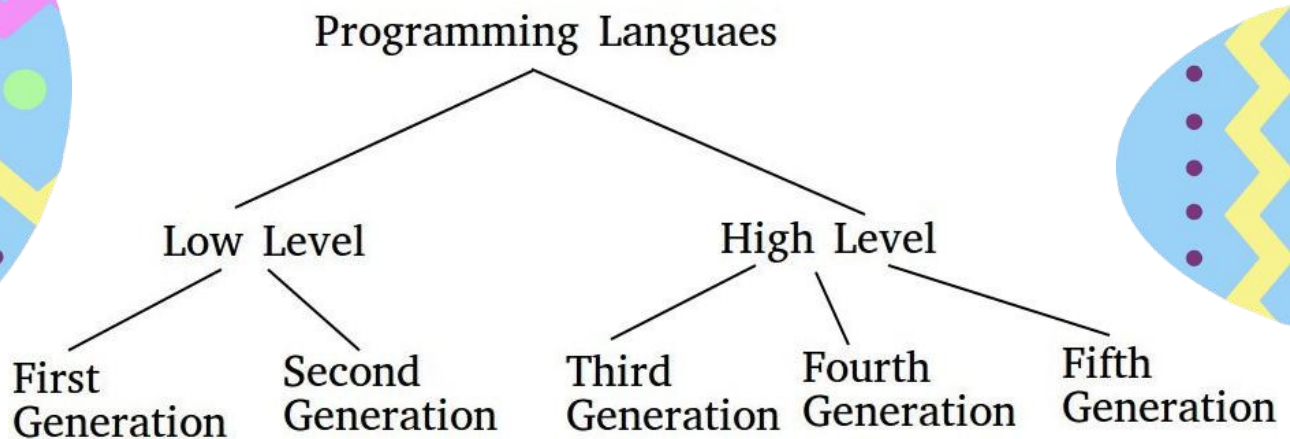
1. First Generation Language :

- The first generation languages are also called machine languages/ 1G language.
- This language is machine-dependent.
- The machine language statements are written in binary code (0/1 form) because the computer can understand only binary language.
- The programs written in these languages are executed very speedily and efficiently by the CPU of the computer system.
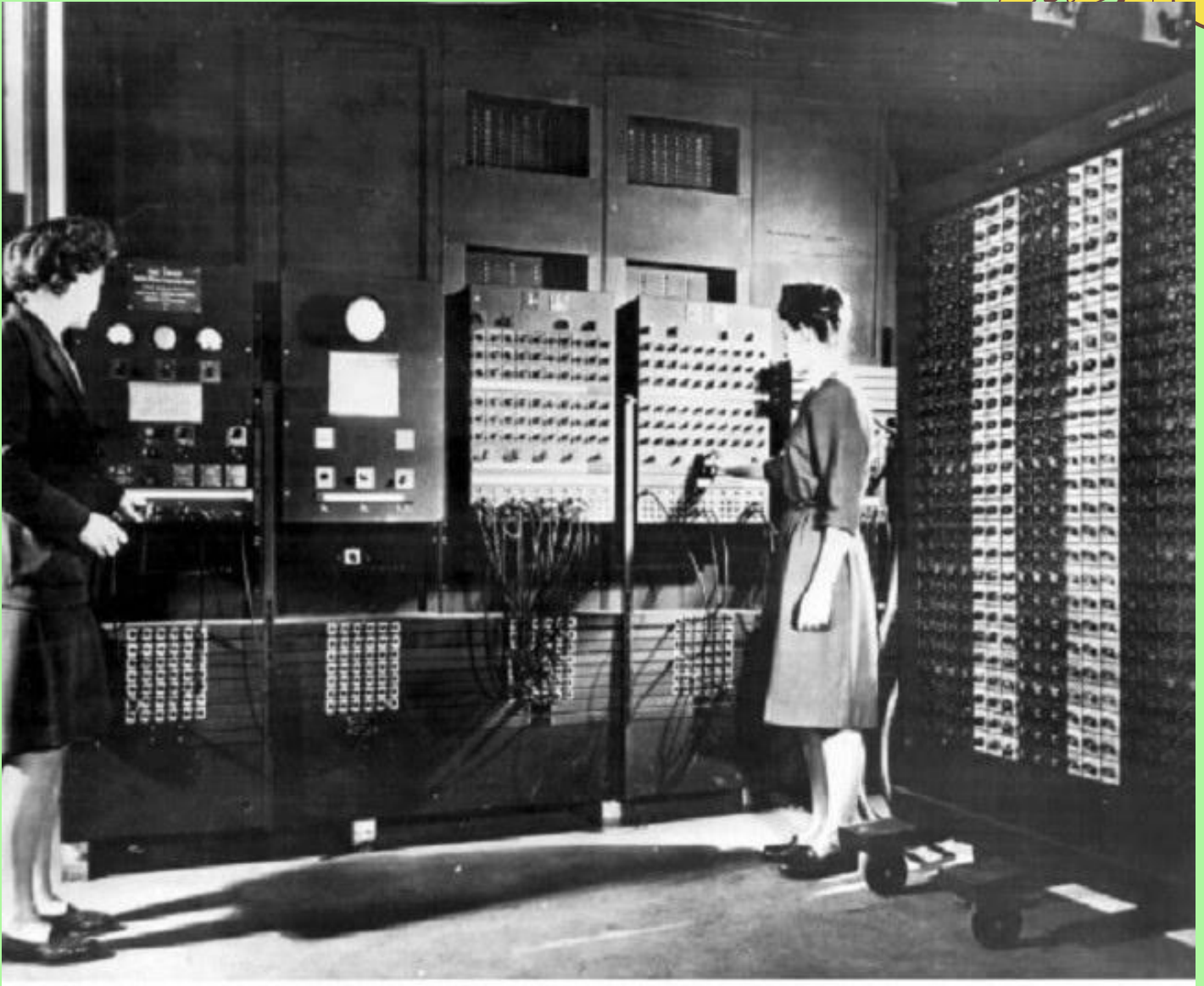
Advantages :

- Fast & efficient as statements are directly written in binary language.
- No translator is required.

Disadvantages :

- Difficult to learn binary codes.
- Difficult to understand – both programs & where the error occurred.

FIRST GENERATION COMPUTER
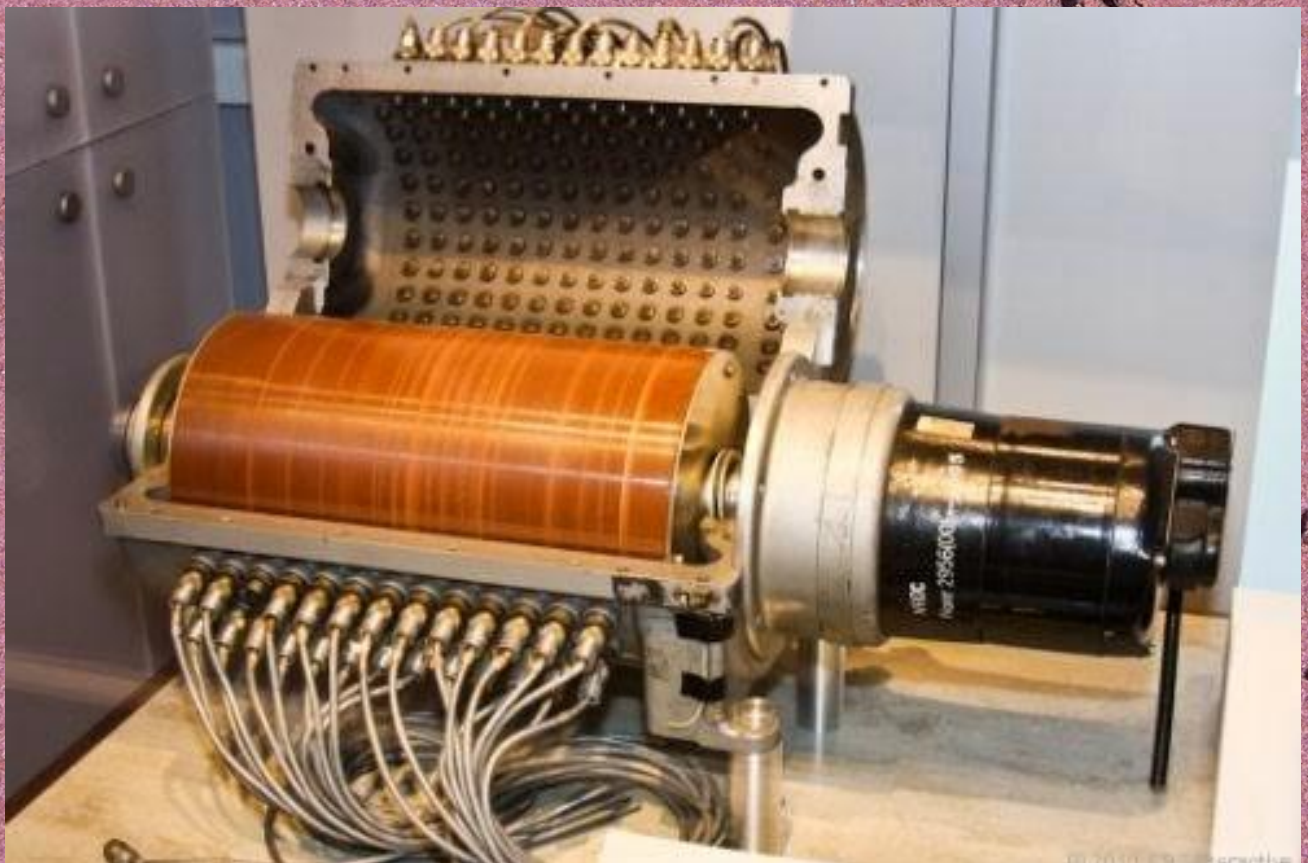

Vacuum Tube

MAGNETIC DRUM-10KB

PUNCHED CARDS

2. Second Generation Language (1950's) :

- The second-generation languages are also called assembler languages/ 2G languages.
- Assembly language contains human-readable notations that can be further converted to machine language using an assembler.
- Assembler - converts assembly level instructions to machine level instructions.
- Programmers can write the code using symbolic instruction codes that are meaningful abbreviations of mnemonics.
- It is also known as low-level language.

Advantages :

- It is easier to understand if compared to machine language.
- Modifications are easy.
- Correction & location of errors are easy.

Disadvantages :

- Assembler is required.

Assembly Language

Assembly Language		Machine Language

mov ecx, ebx
mov esp, edx
mov edx, r9d
mov rax, rdx
	Assembler + Linker →	100101011001
		010011111011
		111010101101
		01010101010
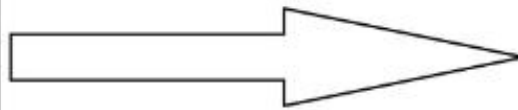
Programmer		Processor

Assembly Language

```
PACK  210(8,13),028(4,7)
PACK  218(8,13),02F(4,7)
MP    212(6,13),21D(3,13)
SRP   213(5,13),03E(0),5
UNPK  050(5,7),214(4,13)
OI    054(7),X'F0'
```

Assembler

```
11110010 01110011 1101
11110010 01110011 1101
11111100 01010010 1101
11110000 01000101 1101
11110011 01000011 0111
```

Machine Language

SECOND GENERATION COMPUTER
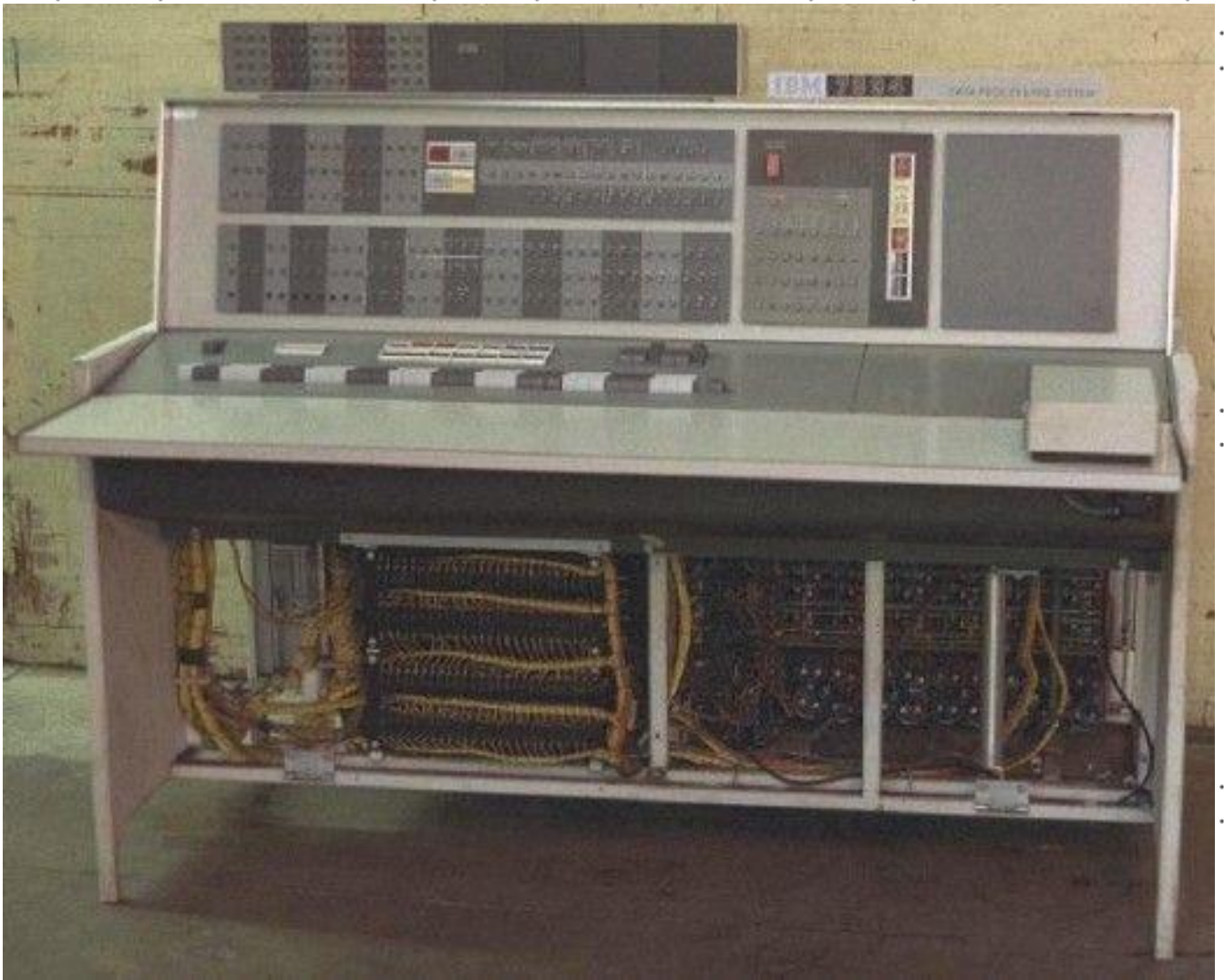
MAGNETIC CORE MEMORY
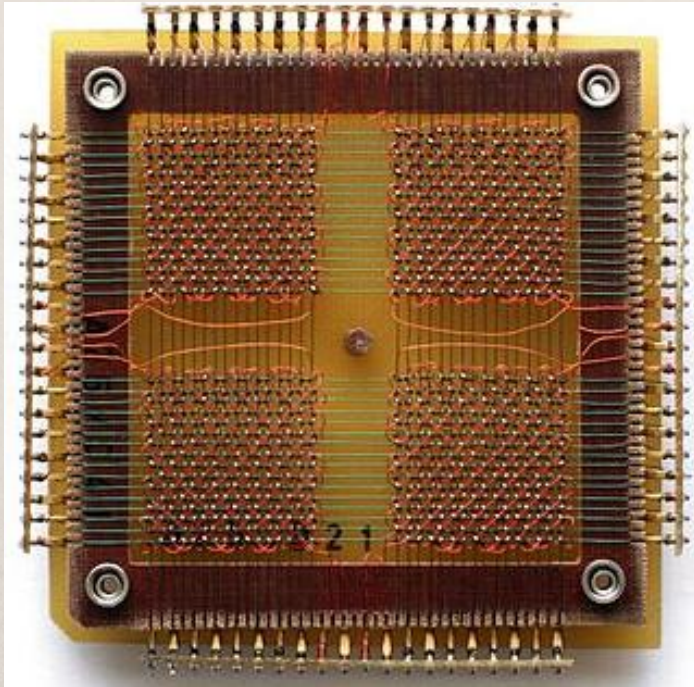
A 32 x 32 core memory plane storing 1024 bits (or 128 bytes) of data.
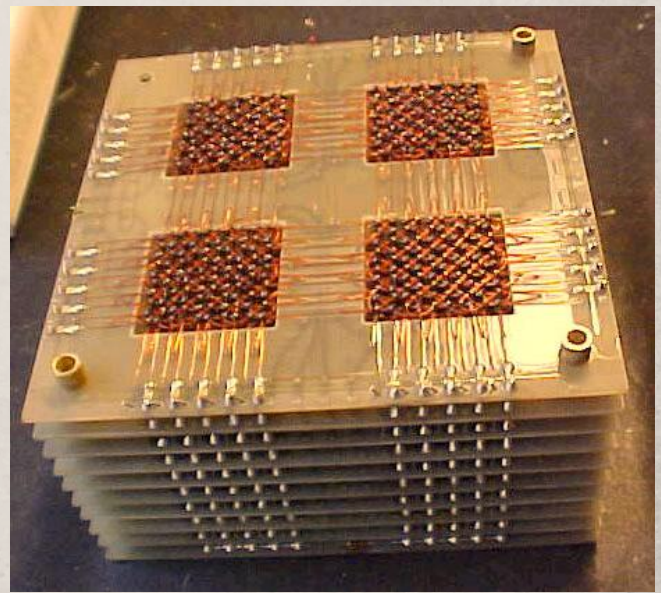
TRANSISTOR
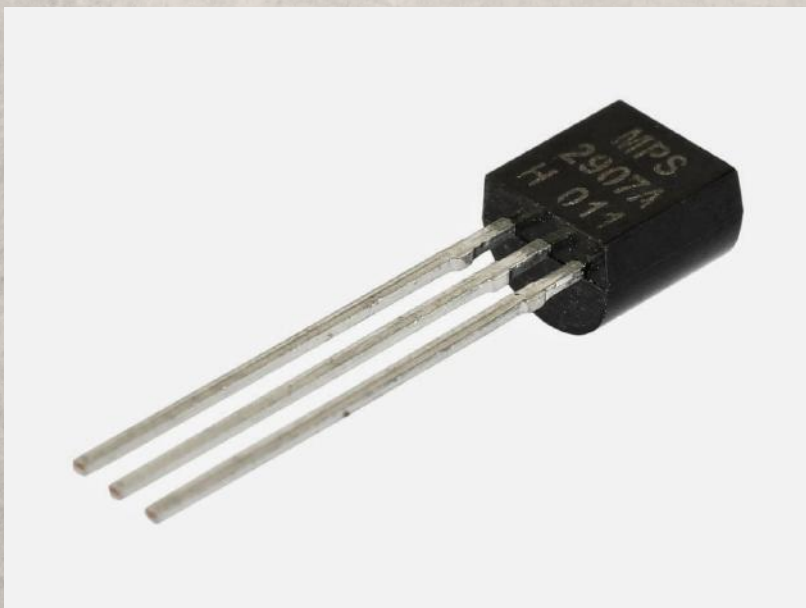
TRANSISTOR-One transistor could replace one thousand vacuum tubes.

VIDEO GAMES CREATED USING ASSEMBLY LANGUAGE
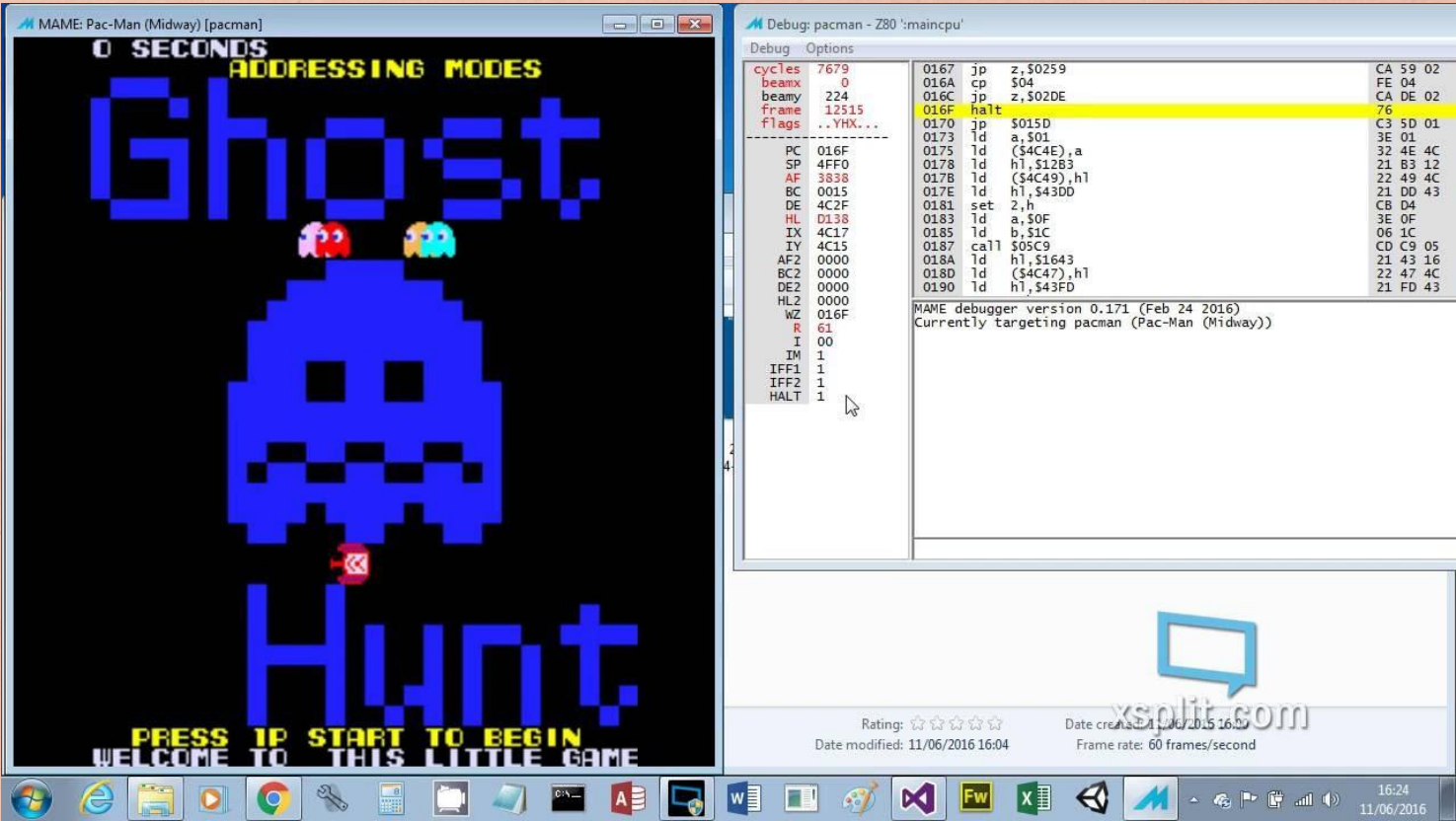
3. Third Generation Language (1956 to 1963) :

- The third generation is also called procedural language /3 GL.
- It consists of the use of a series of English-like words that humans can understand easily, to write instructions.
- Its also called High-Level Programming Language.
- For execution, a program in this language needs to be translated into machine language using Compiler/ Interpreter.
- Examples of this type of language are C, C++, Java, Visual Basic, JavaScript PASCAL, FORTRAN, COBOL, etc.

Advantages :

- Use of English-like words makes it a human-understandable language.
- Lesser number of lines of code as compared to above 2 languages.
- Same code can be copied to another machine & executed on that machine by using compiler-specific to that machine.

Disadvantages :

- Compiler/ interpreter is needed.
- Different compilers are needed for different machines.

APPLICATIONS CREATED USING 3GL

Translating a High Level Language into Binary

High Level Language

```
int X = 2;
int Y = 2;
int SUM;
SUM = X + Y;
cout << SUM;
```

C++ source code

→ **Compiler** →

Object Code

```
...
LDX  02
LDA  02
ADC  X
STA  3c8
...
```

Intermediate code somewhat like assembly

→ **Linker** →

Binary Language

```
001000101
101100100
010110010
110110100
101101001
001000101
```

The executable program
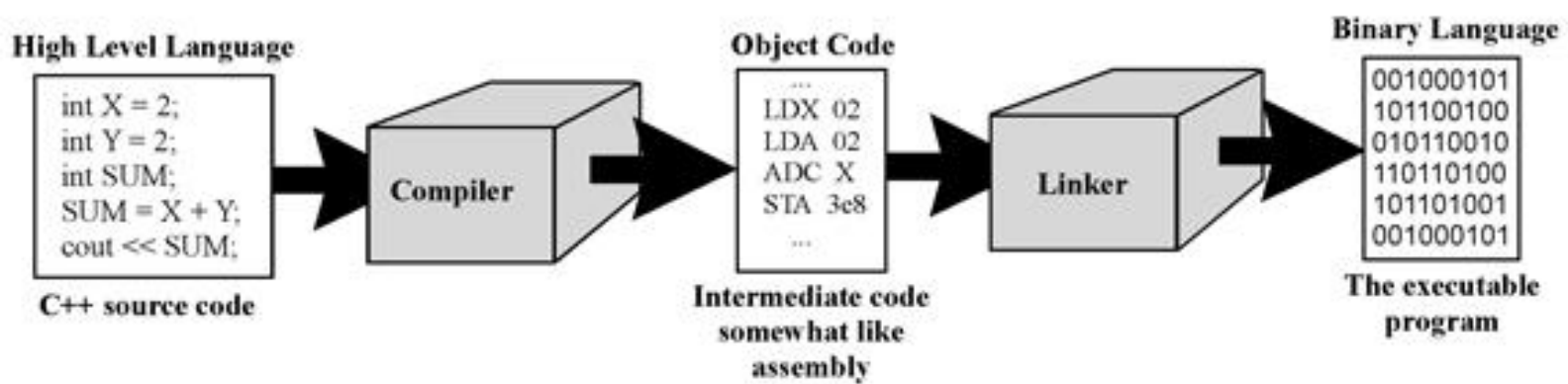
Applications developed using Java:

- Acrobat Reader
- Think Free
- Broadleaf
- Wayfair
- Netflix
- Tinder
- Google Earth
- Uber

Applications developed using C++:

- Adobe Photoshop
- YouTube
- Amazon.com
- Windows OS
- Microsoft Office
- Mozilla Firefox

THIRD GENERATION COMPUTER

Third generation Computer

Integrated Circuit
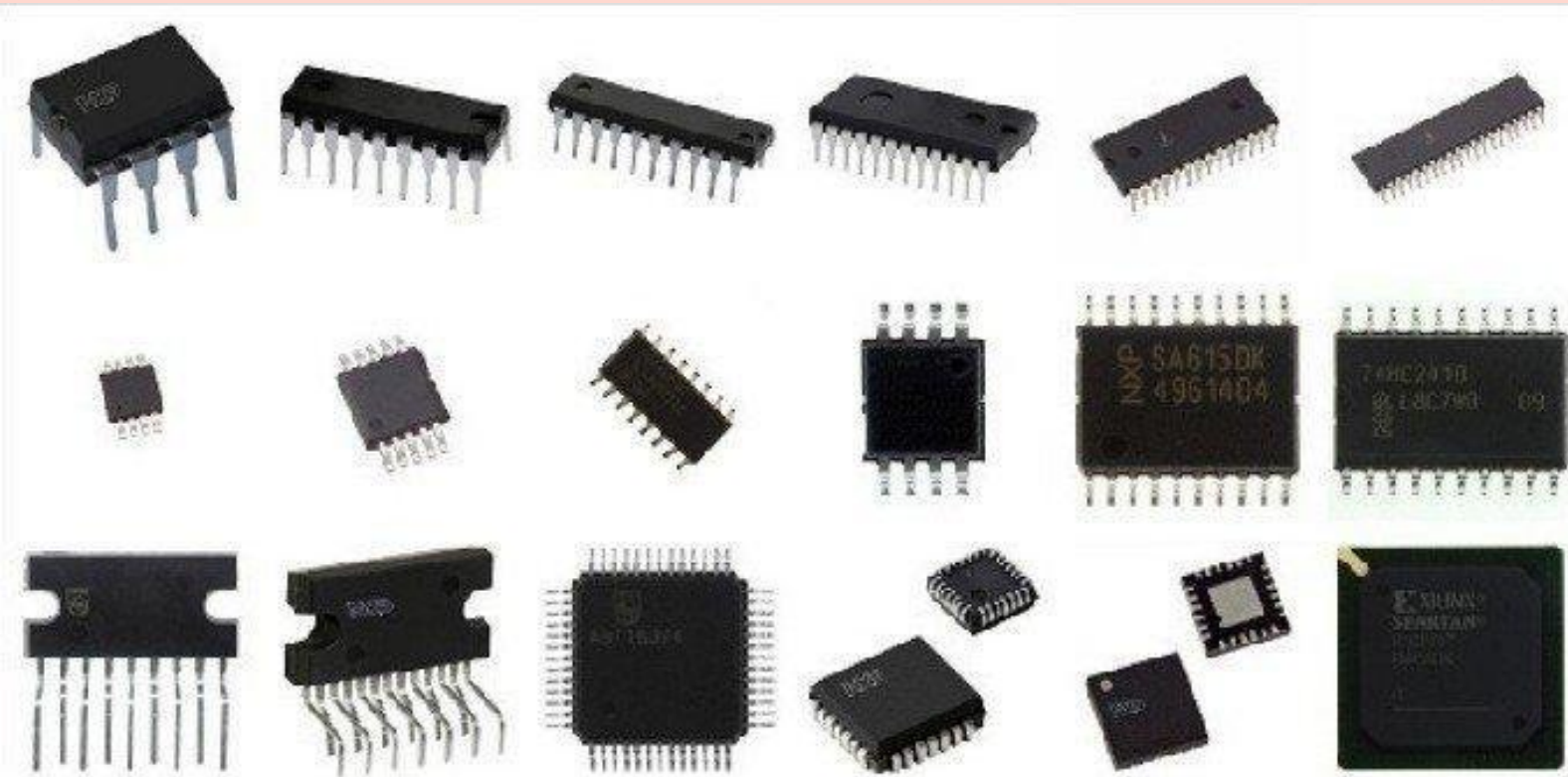
Figure: Integrated Circuits (ICs)

4. Fourth Generation Language (1970 to 1990) :

- The fourth-generation language is also called a non - procedural language/ 4GL.
- It enables users to access the database.
- Examples: SQL, Foxpro, Focus, Perl, Python, Ruby, etc.
- These languages are also human-friendly to understand.

Advantages :

- Easy to understand & learn.
- Less time required for application creation.
- It is less prone to errors.

Disadvantages :

- Memory consumption is high.

GENERATION OF COMPUTER

First Generation — Vacuum Tubes
Second Generation — Transistors
Third Generation — Integrated Circuit
Fourth Generation — Very large scale integration — VLSI
Fifth Generation — Ultra large scale integration — ULSI

EDUCATECITY.COM
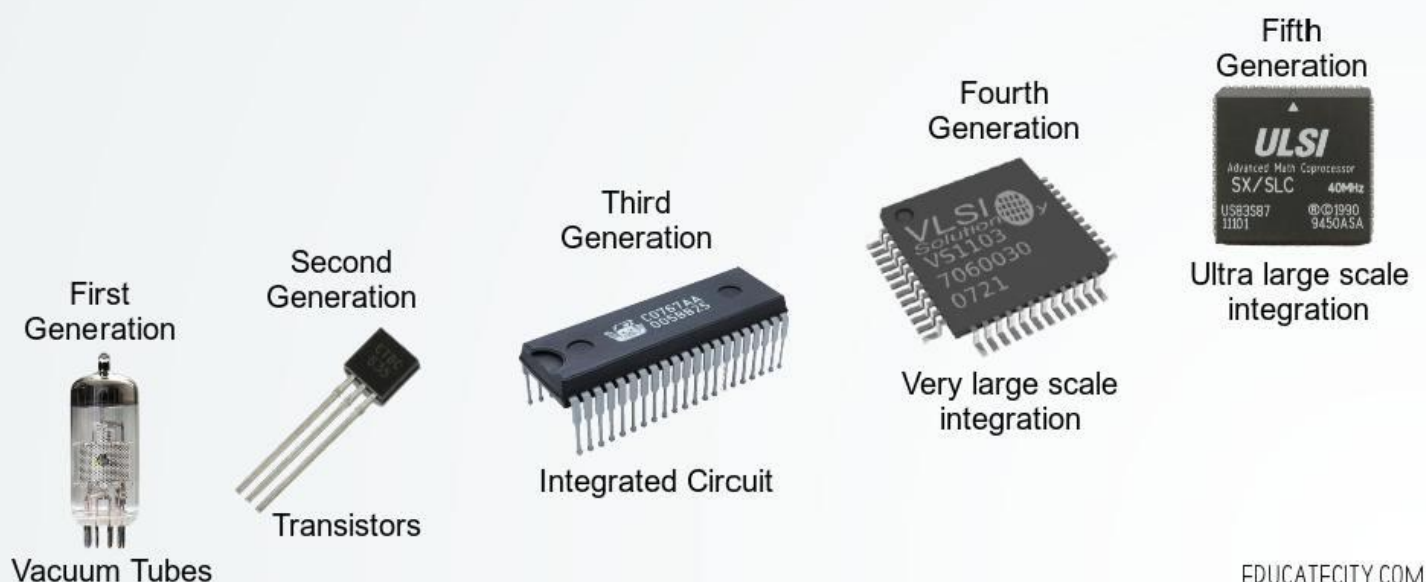
APPLICATIONS CREATED USING 4GL

Applications developed using Python:

- Dropbox. Dropbox is a popular file hosting service that presents the choice of file synchronization, cloud storage, client software, and personal cloud.
- Spotify.
- Pinterest.
- Uber.
- Quora.
- Facebook.
- Reddit.
- Instagram

5. Fifth Generation Language :

- The fifth-generation languages are also called 5GL.
- It is based on the concept of artificial intelligence.
- 5GL are designed to make the computer solve a given problem without the programmer.
- Examples of fifth-generation languages include Mercury, OPS5, and Prolog.
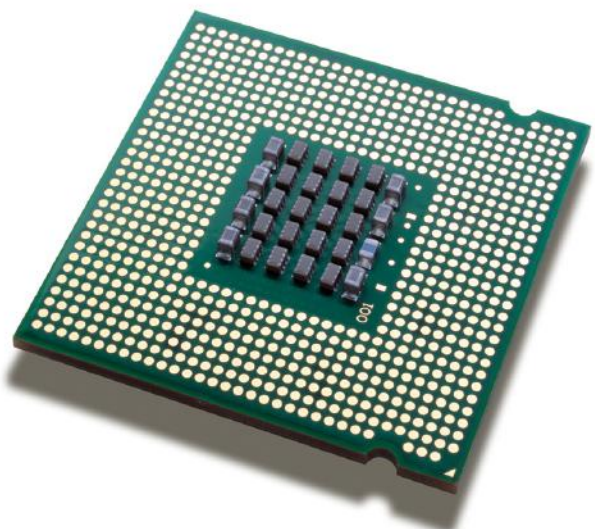
Advantages :

- Machines can make decisions.
- Programmer effort reduces to solve a problem.
- Easier than 3GL or 4GL to learn and use.

Disadvantages :

- Complex and long code.
- More resources are required & they are expensive too.

APPLICATIONS CREATED USING 5GL

- Fitbit or an iWatch, collects a lot of data like the sleep patterns of the individual, the calories burnt by him, heart rate and a lot more which can help with early detection, personalization, even disease diagnosis.
- Autopilot by Tesla
- Netflix and Amazon Prime
- Siri is one of the most popular personal assistant offered by Apple in iPhone and iPad. The friendly female voice-activated assistant interacts with the user on a daily routine. She assists us to find information, get directions, send messages, make voice calls, open applications and add events to the calendar.
- The flying drones are already shipping products to customers home – though on a test mode. They indicate a powerful machine learning system that can translate the environment into a 3D model through sensors and video cameras.
- Echo was launched by Amazon, which is getting smarter and adding new features. It is a revolutionary product that can help you to search the web for information, schedule appointments, shop, control lights, switches, thermostats, answers questions, reads audiobooks, reports traffic and weather, gives info on local businesses, provides sports scores and schedules, and more using the Alexa Voice Service.