Data Dependences:

- Instruction i produces a result that may be used by instruction j, or
- Instruction j is data dependent on instruction k, and instruction k is data dependent on instruction i.

The second condition simply states that one instruction is dependent on another if there exists a chain of dependences of the first type between the two instructions. This dependence chain can be as long as the entire program.

Some of the data dependences are:

1. Name Dependences
2. Control Dependences

1. Name Dependences:

The name dependence occurs when two instructions use the same register or memory location, called a name.

There are two types of name dependences between an instruction i that precede instruction j in program order:

1. An anti dependence between instruction i and instruction j occurs when instruction j writes a register or memory location that instruction i reads.
2. An output dependence occurs when instruction i and instruction j write the same register or memory location.

2. Control Dependences:

A control dependence determines the ordering of an instruction, i, with respect to a branch instruction so that the instruction i is executed in correct program order.
For example-

```
if A1
{
C1
};
if A2
{
C2
};
```

Here C1 is control dependent on A1, and C2 control dependent on A2.