**Activity-2**

**Iron grading based on tensile strength**

**(C-Language)**

**1) Research**

This project shows the grade of iron based on tensile strength of the given material. The grading system is taken from the reference given below.

Tensile Strength :- Tensile strength is the maximum pulling stress a material can withstand before it breaks or is permanently deformed.Unit of measuring tensile strength is Mpa (Megapascal).

**References :-**

<https://en.wikipedia.org/wiki/Iron#Applications>

| Material | TS (Mpa) |
| --- | --- |
| Iron whiskers | 11000 |
| Ausformed (hardened) steel | 2930 |
| Martensitic steel | 2070 |
| Bainitic steel | 1380 |
| Pearlitic steel | 1200 |
| Cold-worked iron | 690 |
| Small-grain iron | 340 |
| Carbon-containing iron | 140 |
| Pure, single-crystal iron | 10 |

**2) Analysis**

Using concepts of C programming language and concepts such as if-else , for loop , input-output. This analysis can be useful for industrial sectors where iron is utilised as a raw resource.

**3) Ideate**

The idea of the overall project is to grade the iron based on its tensile strength which can later be segregated as per needs.The program will first take input of tensile strength in a megapascal unit. It will compute in the backend automatically which type of iron suits the appropriate tensile strength.

1. Start
2. Take input from user in megapascal
3. Compute
4. Print appropriate grade of iron material
5. Stop

**4) Build**

#include <stdio.h>

int main() {

printf("-----Iron Grading System-----\n");

int tensile\_strength;

printf("Enter tensile strength (Mpa) unit :- \n");

scanf("%d",&tensile\_strength);

if(tensile\_strength >= 10 && tensile\_strength <140){

printf("It is Pure, single-crystal iron ");

}

if(tensile\_strength >= 140 && tensile\_strength <340){

printf("It is Carbon-containing iron");

}

if(tensile\_strength >= 340 && tensile\_strength <690){

printf("It is Small-grain iron iron");

}

if(tensile\_strength >= 690 && tensile\_strength <1200){

printf("It is Cold-worked iron");

}

if(tensile\_strength >= 1200 && tensile\_strength <1380){

printf("It is Pearlitic steel");

}

if(tensile\_strength >= 1380 && tensile\_strength <2070){

printf("It is Bainitic steel");

}

if(tensile\_strength >= 2070 && tensile\_strength <2930){

printf("It is Martensitic steel");

}

if(tensile\_strength >= 2930 && tensile\_strength <11000){

printf("It is Ausformed (hardened) steel");

}

else{

printf("It is Iron whiskers");

}

}