Proposal for the C++ class of **MOSFET**  
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**Data Members:**

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| --- | --- | --- |
| **Member Name** | **Data type** | **Description** |
| l | double | Length of a transistor |
| w | double | Width of a transistor |
| Tox | double | Gate Oxide Thickness |
| Cox | double | Oxide Capacitance |
| m | double | Mobility |
| Vgs | Double | Gate Voltage range |
| Nb | Double | Channel doping |
| Results[] | double | To print results in file |

**Member Functions:**

**Constructors:**

|  |  |  |
| --- | --- | --- |
| **Declaration** | **Parameters** | **Purpose/Use** |
| MOSFET() | No parameters, all data members initialized to 0 | Default |
| MOSFET(double l, double w) | Set *l* and *w*, Rest all to default values | calculations oriented |
| MOSFET(double l, double w, double Cox,double tox,double Vgs double Nb) | Set *l*, *w,tox,cox,m,Vs,Nb to some default values* | All parameters |

**Accessors:**

|  |  |  |
| --- | --- | --- |
| **Declaration** | **Data Member** | **Notes** |
| void set\_l (double x) | *l* | Set value of x to *l* |
| double get\_l() | *l* | Return the value in *l* |
| void display\_l() | *l* | Display value of *l* |
| void set\_w(double x) | *w* | Set value of x to *w* |
| double get\_w() | *w* | Return the value in *w* |
| void display\_w() | *w* | Display value of *w* |
| void set\_Cox (double x) | *Cox* | Set value of x to *Cox* |
| double get\_Cox() | *Cox* | Return the value in *Cox* |
| void display\_Cox() | *Cox* | Display value of *Cox* |
| void set\_Tox (double x) | *Tox* | Set value of x to *Tox* |
| double get\_Tox() | *Tox* | Return the value in *Tox* |
| void display\_Tox() | *Tox* | Display value of *Tox* |
| void set\_m (double x) | *m* | Set value of x to *m* |
| double get\_m() | *m* | Return the value in *m* |
| void display\_m() | *m* | Display value of *m* |
| void set\_Vg (double x) | *Vg* | Set values of x to *Vg* |
| double get\_Vg() | *Vg* | Return the value in *Vg* |
| void display\_Vg() | *Vg* | Display value of *Vg* |
| void set\_results(double x[]) | *results* | Set values of x to *Vd* |
| double get\_results() | *results* | Return the value in *Vd* |
| void display() | *results* | Display value of *Vd* |
| void set\_Nb (double x) | *Nb* | Set value of x to *Nb* |
| double get\_Nb() | *Nb* | Return the value in *Nb* |
| void display\_Nb() | *Nb* | Display value of *Nb* |

**Custom Functions:**

|  |  |  |
| --- | --- | --- |
| **Declaration** | **Relationships /Logic** | **Purpose/Use** |
| double Trans-conductance |  | To calculate Trans-conductance d Voltage |
| Double Current |  | To calculate the drain current |
| void drawMosfet | In a 300 x400 pixel window draw a general MOSFET to show the user how it looks like , It will be mainly six rectangles out of which one is the largest one called the substrate, three others will be on top of the bigger one with identical colors namely source, gate and drain in order (they should not be in contact) the source and the drain can be interchanged , and a line to all three showing the connections. There has to be a bar called a insulator ( beneath the gate terminal ) . | For Graphical representation |
| void graphics | In a 500 × 500 pixel window showing the transistor in enhancement mode and depletion mode | For a graphical representation of the characteristic |
| void help | Steps on how to run the program and what the program needs for the input and how the outputs are displayed, this will initially show up when the program starts | Introductory material |

**Destructors:**

|  |  |
| --- | --- |
| **Declaration** | **Notes** |
| ~MOSFET() | Default destructor |

Note: Since Threshold Voltage and the drain current are dependent on lot of other parameters apart from the above mentioned, the rest are take with the default values hardcoded