**AP Computer Science A Name Connor Hunter**

**Boolean Logic – Compound Boolean Expressions**

**(A && B) || !C**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **A** | **B** | **C** | A&&B | !C | **(A && B) || !C** |
| T | T | T | T | F | T |
| T | T | F | T | T | T |
| T | F | T | F | F | F |
| T | F | F | F | T | T |
| F | T | T | F | F | F |
| F | T | F | F | T | T |
| F | F | T | F | F | F |
| F | F | F | F | T | T |

**!A || !B || !C**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **A** | **B** | **C** | !A | !B | !C | **!A || !B || !C** |
| T | T | T | F | F | F | F |
| TT | T | F | F | F | T | T |
| TT | F | T | F | T | F | T |
| T | F | F | F | T | T | T |
| F | T | T | T | F | F | T |
| F | T | F | T | F | T | T |
| F | F | T | T | T | F | T |
| F | F | F | T | T | T | T |

**!(A || B || C)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **A** | **B** | **C** | (A||B||C) | **!(A ||B || C)** |
| T | T | T | T | F |
| T | T | F | T | F |
| T | F | T | T | F |
| T | F | F | T | F |
| F | T | T | T | F |
| F | T | F | T | F |
| F | F | T | T | F |
| F | F | F | F | T |

**!(A && (B || !C)) >>>> !A||!(B||!C) >>> !A||!B && C**

**!B&&!C**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **A** | **B** | **C** | !C | B||!C | (A&&(B||!C) | **!(A && (B || !C))** |
| T | T | T |  |  |  |  |
| T | T | F |  |  |  |  |
| T | F | T |  |  |  |  |
| T | F | F |  |  |  |  |
| F | T | T |  |  |  |  |
| F | T | F |  |  |  |  |
| F | F | T |  |  |  |  |
| F | F | F |  |  |  |  |

**!A || !(B || !C)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **A** | **B** | **C** | !C | B||!C | !A | !(B||!C) | **!A|| !(B || !C)** |
| T | T | T | F |  |  |  |  |
| T | T | F | T |  |  |  |  |
| T | F | T | F |  |  |  |  |
| T | F | F | T |  |  |  |  |
| F | T | T | F |  |  |  |  |
| F | T | F | T |  |  |  |  |
| F | F | T | F |  |  |  |  |
| F | F | F | T |  |  |  |  |

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**Section 5.4 Notes**

**&& (and)**

|  |  |  |
| --- | --- | --- |
| **A** | **B** | **A && B** |
| T | T | T |
| T | F | F |
| F | T | F |
| F | F | F |

**|| (or)**

|  |  |  |
| --- | --- | --- |
| **A** | **B** | **A || B** |
| T | T | T |
| T | F | T |
| F | T | T |
| F | F | F |

**! (not)**

|  |  |
| --- | --- |
| **A** | **!A** |
| T | F |
| F | T |

DEMORGAN'S LAW

!(A&&B) is the same as !A || !B

!(A || B) is the same as !A && !B

|  |  |  |  |
| --- | --- | --- | --- |
| **A** | **B** | **A && B** | **!(A && B)** |
| T | T | T | F |
| T | F | F | T |
| F | T | F | T |
| F | F | F | T |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **A** | **B** | **!A** | **!B** | **!A || !B** |
| T | T | F | F | F |
| T | F | F | T | T |
| F | T | T | F | T |
| F | F | T | T | T |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **A** | **B** | **!A** | **!B** | | **!A && !B** | |
| T | T | F | F | | F | |
| T | F | F | T | | F | |
| F | T | T | F | | F | |
| F | F | T | T | | T | |
| **A** | **B** | **A || B** | | **!(A || B)** | |
| T | T | T | | F | |
| T | F | T | | F | |
| F | T | T | | F | |
| F | F | F | | T | |