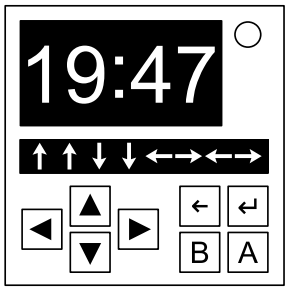
On the Subject of the Gamepad



Oh, the layout of the buttons on this thing takes me back to my childhood! Except I didn't expect to see that on a time bomb, even. Play time is over, I suppose.

See Appendix MathConcepts: Mathematical Concepts for more information.

- Two 2-digit numbers will appear on the top LCD display. The bottom has eight keys: the input keys (◀▲▼▶AB), Return, and Backspace.
- Determine the correct command, made of two subcommands, to input, depending on the properties of the two numbers. Use the first match.
- The two numbers are notated *x* and *y*. Individual digits are notated as *abcd*. A number followed by *n* means a multiple of that number.

Global Overrides	
Apply all matches <u>after</u> determining the two commands.	• If x = 11n, switch the first keypress with the second, and the fifth with the seventh. • If a = 1 + d, switch the third and fourth keypresses, as well as the sixth and eighth. • If x or y is a highly composite number, switch the order of the subcommands. • If x and y are perfect squares, flip the entire sequence.

First Subcommand	
x is prime	▲▲▼▼
x = 12n	▲A◀◀
a+b = 10 AND last digit of serial number is odd	AB◀▶
x = 6n + 3 OR x = 10n + 5	▼◀A▶
x = 7n AND y ≠ 7n	◀◀▲B
x = c × d	A▲◀◀
x is a perfect square	▶▶A▼
x = 3n − 1 OR bomb has **unlit** ind. labeled SND	▶AB▲
60 ≤ x < 90 AND bomb has no batteries	BB▶◀
x = 6n	ABA▶
x = 4n	▼▼◀▲
else	A◀B▶

Second Subcommand	
y is prime	◀▶◀▶
y = 8n	▼▶B▲
c−d = 4 AND bomb has a Stereo RCA	▶A▼▼
y = 4n + 2 OR bomb has lit ind. labeled FRQ	B▲▶A
y = 7n AND x ≠ 7n	◀◀▼A
y is a perfect square	▲▼B▶
y = a × b	A▲◀▼
y = 4n − 1 OR bomb has a PS/2 port	▲BBB
c > d AND bomb has 2 or more batteries	AA▲▼
y = 5n	BAB◀
y = 3n	▶▲▲◀
else	B▲A▼

Appendix MathConcepts: Mathematical Concepts

This appendix contains a brief overview of some mathematical concepts used in the Gamepad module.

Prime Numbers

A prime number is a counting number (positive whole number) that can only be divided by 1 and itself. In other words, there is no way to share a prime number of donuts equally among any number of friends (unless you have as many friends as donuts!).

The prime numbers below 100 are: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97.

Perfect Squares

A perfect square is any whole number multiplied by itself.

The perfect squares below 100 are: 1, 4, 9, 16, 25, 36, 49, 64, 81.

Highly Composite Numbers

A highly composite number (HCN) has more divisors than any smaller positive integer. For example, 6 can be divided by 1, 2, 3, and 6, which is more than the last HCN, 4, which has 1, 2, and 4. 8 can be divided by 1, 2, 4, and 8, but a smaller number (6) has an equal number of divisors, so it is not a HCN.

The highly composite numbers below 100 are: 1, 2, 4, 6, 12, 24, 36, 48, 60.