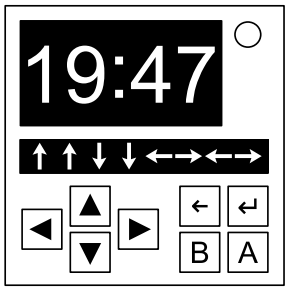
# On the Subject of the Gamepad




*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.<br>• If a = 1 + d, switch the third and fourth keypresses, as well as the sixth and eighth.<br>• If x or y is a highly composite number, switch the order of the subcommands.<br>• 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.