

## Monkeytype (Reductio Simiorum)

Two billionaires were slumming it over sushi at Masa. The meal started discreetly, as they didn't like being recognized, but soon they became engaged in a loud and furious argument. They were disagreeing about the old saw that enough monkey typists would eventually produce the works of Shakespeare.

They both conceded that the concept required that the typing would be random, but while one billionaire, Freddie Fauntleroy, was confident that monkeys on typewriters would generate sufficiently random text, the other billionaire, Seamus MacDougal, asserted that monkeys banging on typewriters surely would favor the keys that were in more or less the middle of the left and right sides of the keyboard. He just couldn't see monkeys spending much time on the far upper left or the extreme lower right, which meant the output wouldn't be truly random, and would never converge on Shakespeare.

"What about spaces?" Fauntleroy asked. "If the spaces are in the right place it might come out as actual text, but what if the monkeys hardly ever hit the spacebar?"

"Exactly my point," said MacDougal.

They had already agreed that since words average 5-7 letters in length, infrequent spacing would skew the results far away from the anticipated accidental intelligibility. "But," MacDougal pointed out, "The original concept never said anything about spacebars."

A nearby sushi kibitzer pointed out that in prior centuries, writing was often done scriptio continua, without any spaces at all. One of the waiters suggested they should just assume the monkeys were typing in

some language that doesn't use word gaps, and have someone interpret it on that basis. After much haggling, they finally agreed that since the text was being generated at random, assumptions shouldn't be made as to what language it was in, and the choice of language would also be random. As they were handing the maitre de a generous tip, he pointed out that the typing could be re-interpreted in any language at all, once it was captured in the computer.

MacDougal glanced at Fauntleroy and then frowned at the maitre de. "Who said anything about computers?"

For a brief time they were stymied by the idea that the language would be constantly changing as the monkeys typed. This would mean that one page might be in English and the next might be in French and the next in Swahili. After further brainstorming, they decided that randomizing the language was too ridiculous and the last thing they wanted was to be even the slightest bit ridiculous, since obviously some real money and time would be involved getting the experiment off the ground. Still further discussion led to agreement that once the typed pages were collected, an editorial person would insert a certain amount of random spaces at intervals that roughly corresponded to the incidence of spaces in human text. English of course was chosen, since both billionaires spoke nothing else.

The project began modestly in 2019, almost as a joke, although Fauntleroy and MacDougal were not much into humor, *per se*. Initially, the pilot setup involved a mere dozen monkeys, strapped down at a dozen old mechanical typewriters. It took an unexpectedly long time to get the monkeys to understand that they were supposed to type. The clacking mechanical contraptions did hold some fascination for the simians, as much for pulling as for pressing, but the idea of pressing keys individually was never realized. Monkey typing meant hitting the machine, mainly in the keyboard area, in various ways, almost none of which included striking keys one at a time. Everyone agreed that this did enhance the desired randomness.

Much improvisation was required to keep the monkeys in position, to motivate them to keep typing, and to keep them fed and reasonably clean throughout a monkey day at the office. The first volunteer monkey handlers soon had to be upgraded to professional animal trainers experienced

in wrangling primates. Various species were used, and the experiment eventually settled on capuchins, because they fit the experimental cages initially employed, and their hands were roughly compatible with standard office model typewriters.

There were 60 typewriters in the second round and by summer they had been typing for four months; not much had turned up. “You should fsdfsflkgg” was the longest sentence fragment that could be found.

After much wrangling, the group managers were able to convince the billionaires that the experiment was still valid even if the typewriters were set up as computer input devices. It was much more difficult for them to concede that paper wasn’t necessary, but eliminating the paper-changing task enabled them to fire 10% of the animal trainers, many of whom had been complaining about having to restrain the capuchins while feeding clean sheets into the machines. Ribbon changing hadn’t come up yet, but the group managers had already expressed concern that the trainers might be unwilling to take on that chore.

All along, several technically-oriented commentators had suggested that paper was superfluous, so there was widespread popular support for the conversion of the typewriters. No longer were they ordinary typewriters, although the monkeys could not have noticed the change. Electronics had been added so that all keystrokes, even splayed fist-strokes, were captured by computer permitting digital analysis of everything they typed.

The question of the keyboard layout remained a sticking point in the disagreement, and eventually it was resolved by scrambling the key caps on the typewriters and a company was hired to provide 500 typewriters with essentially 500 different randomly assigned keyboard layouts. It wasn’t until the experiment had been in operation for well over a year that a young man who had been emptying waste baskets pointed out that the computer didn’t care what key caps were on the keys, of course, and therefore they could simply produce a list of random keyboard layouts and apply this to each of the typewriters, because the physical typewriters became virtual typewriters as soon as the data had been collected.

At that point there was some discussion of whether the keyboards should be changed in virtual typewriter space, on a page by page basis, or whether it should be changed on a daily basis. Eventually, having

considered that it should be changed with each keystroke, they realized this was simply adding randomness to randomness and the net result couldn't possibly be any more or less interesting than letting the monkeys type however they felt like typing, and assuming they were typing in English. So after 3-4 years of translation and reinterpretation, the text extraction algorithm was simplified to just inject spaces every 5-7 characters. At the insistence of Fauntleroy, each page was to be interpreted with a series of space-injection passes, starting with the first letter, then the second letter, and so on, so that all possibilities of word breaks were covered.

There was also lengthy discussion on how to merge the output from multiple monkeys. Should each monkey's output be considered one stream of typing, or should all the output from all monkeys be treated sequentially? This topic was tabled on the principle that future analysis could simulate either scenario, and that principle became a touchstone for pretty much all further questions of protocol.

The project proceeded apace, with consistent press coverage, and gradually became something of a meme. At the water cooler, people would remark, "Monkeys written anything good yet?" and "What's the latest on the monkeys?" Basking in public approval, the billionaires increased their funding, and by 2022 a small building had been dedicated on the outskirts of Baltimore, populated by more than 500 monkeys and a significant support staff. In 2024 it was expanded to house 1,500 monkeys, and several monkey-management enhancements were made, principally in the areas of grooming and sanitation. Each year another expansion took place, and by 2026 the population had risen to 9,000 monkeys, typing in three shifts on 3,000 pseudo-mechanical typewriters.

In the Forbes annual monkey update interview, seven years after the project began, Freddy Fauntleroy was quoted as saying, "Well, it seems to me we should have had maybe a sonnet by now." In that same interview it came to light that Fauntleroy had been harboring a secret theory about the experiment. He believed that since monkeys were so close to humans genetically (though chimps and bonobos are much closer than capuchins) their "flavor" of randomness would be much more compatible with literature than some "mechanical random number generator." Physicists, mathematicians, and geneticists around the world wrote obscure letters of protest that were never acknowledged by the popular press.

Quite some time into the experiment, one sentence did emerge that seemed especially promising. It said, “Though yet bx hamlet qrg” and then deteriorated into the general gobbledygook everyone involved in the experiment had grown rather tired of reading. But at the press conference, the two billionaires were still quite frustrated with each other. In a burst of billionaire bravado Fauntleroy announced that until they had approximated the infinity implied in the original monkey-typewriter assertion, namely an infinite number of monkeys typing for an infinite amount of time, nothing could be resolved. MacDougal countered that Fauntleroy was dissembling when he agreed to 500 monkeys for 5 years, since neither number was very close to infinity.

The billionaire rivalry (and continuing public fascination) grew year by year, marshalling more and more of the billionaires’ ever-expanding resources. By 2031, a sizable portion of suburban Baltimore had been acquired and converted into simian text generation, including some 6.9 million monkeys typing in shifts on one-third as many typewriters, and this number of monkeys had been producing output for a little over five years. But the original algorithm demanded that the length of time they typed could not be adjusted—one could only wait. This was a source of great frustration for Fauntleroy and a certain smug arrogance on the part of his competitor.

Eventually, it was decided that the monkeys could be fed small quantities of Adderol or other amphetamines, which did visibly increase the speed of their output. Monkeys who had been perfectly content to bang away, whacking the keyboards only 4-5 times per minute, and the rest of the time whacking other things within reach, now began to whack the keyboard more energetically, sometimes as much as 10-15 times as frequently as they did without the amphetamine. Since the keyboards were only pseudo-mechanical, key jams were impossible, and the computer could discern key sequences within fractions of a millisecond, a happy side-effect of going digital.

Larger monkeys were found to be more productive because, since the typewriters were only used as computer input devices, a monkey with large hands could strike many more keys at one blow than, say, a capuchin or spider monkey. This advantage was offset somewhat by the fact that fewer large monkeys could fit into the same space as the capuchins, but in the end

the typewriter proved to be the limiting factor, so arrangements were made for the largest monkeys that would fit into one typewriter-width of space.

Refinement in experimental protocol dwindled and the experiment reached its logical conclusion two generations after the billionaires had passed away. It had been only its obvious profitability for their heirs and assigns that kept the program in operation for so long. There was a great deal of money involved. On Tuesday, November 17, 2052, the analytical computer which would display a few bursts of intelligible text whenever they occurred at a length greater than 10 characters or two words emitted a stream of text that was many times longer than anything that had appeared since the beginning of the experiment.\*

With some trepidation they got around to reading it, and the great great grandson of Fauntleroy made an announcement to the press later that morning. He held the paper up and with great pride announced that his father had won the contest because although the monkeys had not produced the works of Shakespeare, it had been agreed by now that that was a figure of speech, and that the monkeys were not really expected in this short time to produce all 37 plays, 154 sonnets, and a handful of love letters. But that in fact any intelligible text amounting to more than a handful of words would suffice to indicate that given more time, larger excerpts of the classics / Shakespearean works would inevitably emerge.

“The monkeys have written today,” he said, “the following.” And here he read out the current record-breaking sequence of decipherable language.

Fauntleroy’s wager was of course well-known to the global twitverse: given enough monkeys and enough time, they will type out the works of Shakespeare. Or, realistically, something entirely different. Before their deaths, the billionaires had agreed that Shakespeare being mainly a figure of speech, intelligibility alone was the only real requirement. So any amount of text, in any language, long enough to be noteworthy, would constitute a win for Fauntleroy. Sadly, there was no real criterion for a win by MacDougal, because in lieu of maintaining the project for an infinite length of time, and with only a finite number, albeit a large one, of monkeys, it could be hundreds of years before the first scene of any play, or any lengthy output of intelligible text at all, took place. Be that as it may,

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\* Great international attention flowered for a few days in 2044, when the word “fuck” appeared 17 times on one page—ed.

by this day's event, a record-breaking quantity had emerged, large enough to be extremely encouraging to all involved, and possibly enough to bring the entire enterprise to a favorable conclusion.

So when Fauntleroy IV held up the paper and read it out to multitudes around the world, it was most intriguing that the content the monkeys had generated read simply, "It was Colonel Musturd, in the Conservatory, with the Cundlestink." The obvious misspellings were generously dismissed by everyone, since any typist is likely to misspell things now and again without sacrificing intelligibility.

Not surprisingly, however, a mis-spelled snippet from the ancient game of Clue proved insufficient to satisfy anyone but a few doddering descendants of Herman, Hillel, and Henry Hassenfeld, or Charles and George Parker, or a Mr Anthony Pratt of the former United Kingdom. It was the beginning of the end. Public interest in the project quickly faded, and within a few months Fauntleroy's conjecture was deemed by global consensus to be a failure, and although his great great great grandson never did concede, funding from the MacDougal-Fauntleroy Foundation was soon withdrawn, and the project ended in one of the most famous and expensive anti-climaxes on record.

Coda: Years later, a disillusioned scholar of the New Fatalism social movement took it upon himself to run a new analysis of the monkey output, which had been enshrined in the Fauntleroy Computer Corporation's old headquarters, now a historic landmark within the submerged Baltimore encapsulation of the East Coast sub-sea megalopolis. Running tens of thousands of interpretive algorithms on the vast array of keystrokes stored over half a century by legions of monkeys, the scholar expected to find nothing, and thereby to confirm the essential meaninglessness of life itself. To his surprise, and everyone else's, in 2049, nine pages of monkey output containing nothing but QWER in obviously random combinations, once transposed to A, T, C, & G, spelled out the first nine of the twenty-four chromosomes of bonobo DNA. This was especially surprising, since bonobos had never been employed in the experiment.

Humans have 46 chromosomes. The striped skunk and the pineapple have 50, and the platypus 52. Strawberries have 56. Some ants have only 1, but the prawn has about 90, the red viscacha rat has 102, and the lamprey eel 174. The hermit crab has 254 chromosomes.

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