

# Entscheidungsproblem

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O.K., let's see now... C0013 B7 80 04.

C0013... That's notebook 8; B7 goes to 7E; 80 goes to C0 and 04 to 79...

C001E 8D F0. They're not even trying, are they?

C001E...Same notebook; I could do this all day!

8D to 81. Well I *am* doing this all day!

There now old chap, we oughtn't complain; there are people working day and night in far worse conditions.

...and if we add C0 to the second one, we have F0 going to 30.

I think I see a pattern emerging here...hmmm.

No, that's not why I'm here. That's not why *we* are here. We just pass the decoded texts on; *she* will have to figure out all the details.

I wonder what she looks like...

0371 D0 F1 B2... where did this come from? Well, back to search I suppose.

0371...0371... I *have* seen it somewhere before.

Do *they* have to go through the same loops on the other side? I bet someone is wondering exactly the same thing right now...well, right now plus the time difference!

God, I'm hilarious! Ah, notebook 52! There you are!

I would like to meet my counterpart once this whole thing is over.

D0 to 21; F1 to F1... hehe that always cracks me up! and B2? Well if the most recent one was 30 this should be... Let's see. What if I reverse that and look for the closest vector? No, no, they wouldn't make it so easy.

Actually, *they* don't have much say into it. It's all that bloody machine!

O.K., how about this? B2 to E5? Nope, doesn't work, does it? God!

What was I saying? Ah, yes. *Them!* The others...

B2 goes to FF! There! I imagine *they* will have more than just half-a-dozen of decoders though.

After all, they are fighting a lot of us!

Moving on... AF909 00 80

"Morning!"

"Morning Dave!" Stephen didn't take his eyes off the screen. "How was your weekend? Less boring than mine I hope! My crowning achievement was that I managed not to blink for 92 seconds!"

David made his way around the desk, filled his cup with coffee and sat down. "Wow! I definitely had a more exciting weekend than! I went to see Katie in Bedford."

Stephen folded his arms. "Bedford eh? Your definition of excitement amuses me! Let me guess, you spent the whole time in the pub, just talking."

David thought there was nothing wrong with spending time in a pub chatting with an old friend

over some great real ale, but he knew better than to start an argument with Stephen. "How're we doing?"

"Still on iteration 112... but picking up pace... he has probably memorized most of his new lookup tables, I guess."

David looked at the big clock on the wall. Two o'clock on the dot. "Cool... I guess I can take over now."

It took no more than 3 seconds for Stephen to get his coat on and reach for the door. "See you in couple of days! Good luck with the new guy!"

All right, that was the last of it. Into the pile you go! Enter fresh printouts!

C000... I guess I could go back to teaching. All those eager young minds... and the not so eager ones! Well, one must try to pass the torch of knowledge, even to those less willing to receive it.

00 70 to 21 FF... I would love to see Margaret again. And Charlie. Will there be anyone?

Anything, after this? If only I could just sneak out for a little while...

1004... notebook 2. Why am I even thinking about this?

8D A0... God, what a wimp! People are actually losing their lives out there! *My people*. To hell with these thoughts!

F4001... notebook 5. I mustn't lose faith now. Not after all this time.

What did the poster say? *Your courage, your cheerfulness, your resolution will bring us victory!*

Well, I am sorry to disappoint His Majesty but I don't see many reasons to be cheerful. Courage and resolution will have to suffice.

78 00... and a bit of code breaking of course! God, this pile is not getting any smaller. One of these days I will have to ask for a junior analyst. All this work and they expect me to cope?

I mean, with all this intel, is anyone even checking up on me? Dr. Johanson supposedly takes my books, then brings me new ones. I wish for once she could just say to me: "Good job, John! We're counting on you!" Or something...

BF304... Ah, vanity strikes again! I know there's not going to be any medals for this.

5C to 00... To rest for a day! for an hour? surely I've earned that much.

BFFA2... But then again, war does not rest. War... Mindless games by mindless masses led by equally mindless individuals. Tiny people, blind to anything beyond their tiny hopes and dreams and aspirations. Blind to the vastness of the cosmos and the insignificance of our existence.

Foolish enough to believe that anything we do in our whole lives would even make a dent to the grand scheme of things. Arrogant bastards! But I suppose we do need a reason to get up in the morning...

BFFA2... Hmm. No. I *have* seen this before. I know. But I'm missing something. What am I missing? BFFA1 and A3 is notebook 15, but A2? What am I missing? A2. A2... Come on, you stupid brain! What am I not seeing?

"See now, this is very interesting. At every iteration he seems to be stuck in the same spot."

David was gazing in the distance. He was almost preaching. He had reiterated the same speech a dozen times by now.

The intern was talking notes devoutly. "This is the beginning of the loop, then?"

"It is from our point of view, yes. For him, it's just another difficult code to crack." David started pacing up and down the small room. "It was Dr. Johanson who introduced the iteration scheme. She wanted to find a minimally disruptive way to show John the truth. She thought that if she introduced the code that he had produced as output *back* to him, he would be able to tell the difference. He would stop!"

"But he didn't."

"No, unfortunately not. The first time he saw the new coded printouts with his own timestamps, he thought it was just another clever trick of the Germans. He's been working twice as hard ever since."

The intern looked up with a worried expression. He felt sorry for the wrecked man he could see in the monitors. But he also admired him at the same time. "So, what do they mean? The numbers."

"We don't know. He was working on his third notebook when he was referred to Dr. Johanson." He pointed at the screen. "*These* numbers? I'm not sure even *he* knows. To him, they're just a bunch of symbols that must be transformed to another bunch of symbols. He follows rules and formulas and lookup tables that he compiles himself, but the end result is as intelligible as the input." David looked at the monitor. "He doesn't care that the symbols don't have any meaning." He paused. "He can't *afford* for these symbols to have any meaning."

The intern put his pencil down.

"Do you think he'll ever stop?"

THE END

## The inspiration behind Entscheidungsproblem

The main inspiration behind **Entscheidungsproblem** comes from Turing's solution to David Hilbert's original 'Decidability problem' -- whether any proposition of First-Order Logic can be proven to be true or false with a finite number of steps. The Halting problem, which Turing proved is undecidable, tells us of an algorithm that can check whether *any* algorithm will halt after a finite number of steps. Turing's proof consisted of feeding the code of the checking programme back to itself and proving that the algorithm would be stuck in an eternal loop (therefore unable to tell if the programme will halt). I had already come across a brilliant (yet accurate!) poetic treatment of this problem in Geoff Pullum's poem 'Scooping the Loop Snooper'.

I decided to tell the story from the point of view of the processor running that checking algorithm, in an attempt to portray how the elegance and simplicity of the self-reference that is key to Turing's proof, becomes disturbing through an anthropomorphic lens.

I couldn't think of a better backdrop for my story than the WW2 decoding efforts. I wanted to pay homage to another part of Turing's life: his involvement in the creation of the first computers that helped with the deciphering of the Enigma machine.

There is a final element of the story, related to Turing's imitation game as a test for consciousness -- what is now known as the Turing test -- but only via one of the most famous attempts to refute it. In 1980 John Searle proposed the 'Chinese room' argument against the validity of the Turing test. The central point of the argument was that if a person sitting in a sealed room were fed incomprehensible symbols (in this case Chinese characters) and had instructions on how to manipulate the symbols to produce an output, then an outside observer could mistake the person in the room for understanding Chinese. John, the protagonist, is trapped in the Chinese room with no one but himself to decipher his output.