High Rise - Secret Solution

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The sheer size of this puzzle suggests that it may contain secret content. Fortunately, if the base path is fully solved, little work remains. We observe that each of the 16 stacks contains the name (or nickname, in many cases) of a real-world skyscraper, written top to bottom within the stack:

SLFETGPFTGPT CACSBT**CIEL**BS	NLOWNEOL**VARS** **O**ACOAO	ANAIOAISLTCP WRPTM**FLATIRO** **N**GLU	PDBPSMLMSENP OSEAKSL**SOLEIL**
HLNLOWOLOA**SU** **PERMAN**	OIAIOIE**GHERK** **IN**UVCRH	MENERCRCREIE IOA**OKO**MAPA	EOLOEAEARADA EX**NINA**N
OIOAULPWURSL MPEPEAE**AURA**	PVMVBCANENGR MCNLT**SEARS**EI EIABXMAE	EOTOETETEWRN ENALNR**SOUL**BI MPUPSVI	NENSNSESRNST RL**INDEX**TNETE ODOSPSTSF
TGPMNRTE**CANO** **FHAM**LPSBPSAS WRMDMDEBDGP	EPEROEOAEOER IEALA**VITRI**	NINSDNSTRMLY GITLSN**SHARD**	STDTDHTSTET**S** **CALPEL**ESDSET ETSETYO

In a classic, "do-it-again" step, we record the actual heights of these buildings and perform the extraction from the base path: we walk clockwise around the block, counting the number of buildings we see, and index that far down the stack. In this case, we index into the names of the buildings as they appear in the puzzle. (We index starting at the front of the names, because the names are written top to bottom in the stacks.) This gives the extract phrase CALL IN CHINUP, leading to the answer **CHIN UP**.

Heights (meters): **Number of Buildings Visible and Extract Letters:**

						1	2	2	3	
374	310	87	243		1	C	A	L	L	3
130	180	354	320		3	P			I	2
275	442	243	328		2	U			N	2
90	260	310	190		3	N	I	H	C	2
						3	2	2	2	

Authors' Notes

This puzzle began with the observation that many skyscrapers in London have whimsical nicknames that don't seem like building names at all. The idea of an Upwords game that

extracted using a Skyscrapers-esque logic puzzle with the names of skyscrapers secretly built in came from there. We claimed LONDON TIPTON as the front half answer due to its strong thematic ties and CHIN UP for the secret answer as it evoked looking upwards.

We began construction by compiling a list of skyscrapers with nicknames and their heights, which was then expanded into a list of skyscrapers with interesting names in general. We generated a list of 202 skyscrapers and gave each a score from 1 to 5 based on notoriety, name length, and how interesting their names were. We then wrote a program in Python to identify 16-tuples of skyscrapers that had the letters of CALL IN CHIN UP in the appropriate places based on our indexing scheme. We generated several candidate grids and chose a favorite based on skyscraper quality and total character counts; we were pleased to be able to include SUPERMAN, which is the name of the most famous skyscraper in Providence, RI.

Over the next few months, we developed search algorithms to algorithmically construct the 16 stacks of letters that would secretly house our skyscrapers (and also LONDON TIPTON, near the top). The most successful algorithms were beam searches with heuristic pruning, maintaining a beam of around 10000 - 20000 gamestates. Gamestates were scored by tracking the progress towards containing all 16 skyscrapers and LONDON TIPTON, with penalties for arrangements of tower heights which produced height ties or other problematic behavior.

We had originally hoped to only use relatively common words for both the clued and unclued words, but this wound up being impossible. Ultimately, we created two dictionaries, both subsets of SOWPODS: one with more common words that could be used as unclued confirmations, and one with a mix of common and obscure words that could be clued.

The puzzle wound up longer than desired at 67 turns. We provided the first 5 turns as a tutorial in order to cut down on the number of words the solver would need to input, but it was still quite long. It is possible that a shorter solution could have been achieved if we had been able to dedicate more time to construction, but this puzzle was among the longest to develop already.