Date	Things done	Result	Interpretation of the result
9/12/2020	Implement the naïve version of the 2^n solver in python	The program can take a QBF as a string and solve it	The solver cannot adapt to the standard QDIMACS format, modification required
18/12/2020	Implement the brute force solver as well as the QDIMACS parser	The parser can parse the QDIMACS file correctly	The solver is too slow, PNS should be introduced
21/12/2020	Implement the first version of the PNS algorithm	The PNS works correctly, all formula are stored in memory	No standard SAT solving tricks like unit propagation or pure literal elimination was used, the solver works very bad on the 3x3 example
24/12/2020	Implement the unit propagation algorithm	The number of iterations was cut significantly	3x3 example becomes solvable
28/12/2020	Memory optimized the PNS algorithm	Only formulas of the current searching path are stored in memory	After this optimization, the 3x3 example can be solved nearly 8 times faster
1/01/2021	Implement the pure literal elimination with a naïve data structure	The number of iterations was reduced to 1/5 result_PNS.csv	The run time was not improved on the 3x3 example, hence data structure optimization on the formula class is required
3/01/2021	Implement the mobility initialization, which is (1, branching factor) or (branching factor, 1) instead of (1, 1)	The number of iterations was halved	The run time was not improved on the 3x3 example, hence data structure optimization on the formula class is required
7/01/2021	Implement the data structure optimization of the formula class	The run time was improved significantly, the result is in a csv file called resultshuffle_dtopt.csv	It can be seen later that the vast majority of time spent by the algorithm is no longer on unit propagation or pure literal elimination, it is on duplicate the formula instead. This is a very annoying things, because under the current implementation, such thing cannot be optimized easily

8/01/2021	Implement the dynamic branching	The program can have a branching factor of 2,4,8,16 instead of only 2. Result is recorded in resultshuffle_bf.csv	In all such cases, PNS with mobility initialization would take around half the iterations than standard PNS initialization
10/01/2021	Reserve a place for using a SAT solver in the last quantifier block	Tested correctly, if I get the SAT solver library, the solver should be invoked on time	
23/01/2021	Detected a bug in the brute force implementation, I forgot to simplify the formula	Completely unexpected behaviour, the brute force solver is even faster than PNS when solving gttt3x3 example	
25/01/2021	Allow 2 parameters, branching factor for existential and branching factor for universal		
31/01/2021	An update version of PNS, referenced article Reducing the Seesaw Effect with Deep Proof-Number Search	Run time improvement	
4/02/2021	Implement the binary frequency method and frequency method	Improve the performance of the gttt3x3 example significantly	We can further try if this method can be used for MPN