

CRAZY SEQUENTIAL REPRESENTATION GENERATION: DETERMINE ALL REPRESENTATIONS FOR 10958 IN TERMS OF INCREASING ORDER FROM 1 TO 9

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ABSTRACT

This paper goes over crazy sequential representation generation for the whole number 10958. A computational process is created to produce all possible crazy sequential representations for any value, with any sequence and any operation set. The computational process receives 2 inputs, a sequence of numbers and a set of operations. The sequence used in this paper will be in terms of increasing order from 1 to 9. The operations used in this paper will be all PEMDAS operations including concatenation.

1 INTRODUCTION

Sequential Representation Generation is the process of building a sequence of numbers with a set of operations and providing a result for the generated sequence. Taneja (2013, Feb) originally proposed a paper on a simple mathematical problem whereby a sequence could with limited operations could generate a value in a range of 44 to 1000. Several crazy sequential representations that were missing in the original paper and subsequent versions were determined by Taneja at a later date to complete the range from 0 to 1111 (2014, Jan) with a missing value of 10958 in increasing order of 1 to 9. Parker (2017) presented a solution to the 10958 value using concatenation. Wylie (2018) expanded on crazy sequential representation even further by applying similar crazy sequential representation rules to arbitrary bases.

This paper spurred by the original lack of a sequence in Taneja's "Crazy Sequential Representation: Numbers from 0 to 11111 in terms of Increasing and Decreasing Orders from 1 to 9," and a lack of algorithmic methods for determining sequenced representations for values. Taneja found a solution to all whole numbers from 0 to 11111 using a sequence of numbers from 1 to 9 in increasing and decreasing order using the operations of addition, subtraction, multiplication, division, powers, and concatenation reflected in equations 1 to 6 respectively. 10958 is the only whole number without a crazy sequential representation in terms of increasing order of 1 to 9.

$$a + b \quad (1)$$

$$a - b \quad (2)$$

$$a \cdot b \quad (3)$$

$$\frac{a}{b} \quad (4)$$

$$a^b \quad (5)$$

$$a||b \quad (6)$$

2 COMPUTATIONAL PROCESS

The computational process for generating crazy sequential representations is split into 4 main brute force techniques, generating all possible operations sets, creating a set of all possible organizations, stringifying each of the organization sets to then be fitted with a representation. Firstly we gather all operation sets and organizations. Each organization and operations set is then combined to see which ones will equal our whole number value, 10958. Algorithm 1 describes the process for gathering all of the representations from the operations, *OPSS*, and organizations, *OGS*, and adding the representation, *R*, on to the representation set, *RS*, if it equals our whole number value.

```

DEFINE Representations
  SET NS to [1, 2, 3, 4, 5, 6, 7, 8, 9];
  SET OS to [+ , - , | , ^ , / , ^];
  SET OPSS to OperationsSet(OS);
  SET OGS to OrganizationSet(NS);
  SET RS to [];

  OPSS => OPS
  OGS => OG
  SET R to GetRepresentation(OPS, OG, NS)
  SET S to GetSolution(R);
  IF S == 10958
    RS.Add(R);
  return SOL;
END DEFINE

```

Algorithm 1: Pseudocode for finding all representations that equal 10958.

A representation is a list of numbers organized by brackets with operations separating the bracketed numbers. In our universe the operations will always be of space $l - 1$ where l is the size of the size of the sequence, the organization will always be of space l . When differentiating between an operation and a number in the representation we use N and O as shorthand respectively. A few examples of shorthand representations and their full valued counterparts for the increasing sequence from 1 to 9 are shown in Figure 1.

$$\begin{aligned}
 N O N O N O N O N O N O N O N O N &\Rightarrow 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 \\
 N O (N O N) O ((N O (N O N)) O N O N) O N &\Rightarrow 1 + (23) - ((4 + (56)) + 7 + 8))^9 \\
 N O ((N O (N O N O N O N) O N O N) O N) &\Rightarrow 1^{((2 + (3 \cdot 4 - 56) + 7 + 8) \cdot 9)}
 \end{aligned}$$

Figure 1: Shorthand representations to examples of operation and sequence insertions.

Our operations would simply be a sequence of operations to replace the O 's in the shorthand representation. Our organization is simply the shorthand representation with a sequence of numbers replacing the N .

3 OPERATIONS

Operations are an operation set inside the set of all operations that will replace the O values in the shorthand representation. The set of all operations is comprised of all combinations of initial mathematical operations provided to us that will fit between the sequence of numbers provided. Figure 2 exemplifies all operations that could exist if we had a 3 number sequence with the operations of addition and subtraction.

$$[[+, +], [+ , -], [- , +], [- , -]]$$

Figure 2: The set of operations for addition and subtraction with a sequence of size 3.

To generate this list we need to know the amount of operations sets that could exist with the provided sequence and operations. Equation 7 reflects the total number of operations sets, t , with the number of available operations, a .

$$t = a^{n-1} \quad (7)$$

We increment from the total number of operations to find the operation at index i and run through all of the operations in an equation, $n - 1$, at index j to find the operation that will be set at index j . Equation 8 provides the operation index, oI , from our incrementing indexes i and j . Algorithm 2 uses oI to generate the set of operations.

$$oI = \left\lfloor \frac{i}{a^j} \right\rfloor \% a \quad (8)$$

```

DEFINE OperationsSet with operations
  SET OPSS to [];
  SET OPS to [];

  FOR  $i$  from  $t$ 
    FOR  $j$  from  $n - 1$ 
      OPS[ $j$ ] = operations[ $oI$ ]
      OPSS[ $i$ ] = OPS
    Return OPSS
  END DEFINE

```

Algorithm 2: Pseudocode for gathering the set of operation sets.

4 ORGANIZATIONS

Organizations are defined by how the numbers will be ordered into parenthesis. When a sequence of four numbers is provided there are only a certain amount of ways in which the numbers can be moved into parenthesis. Figure 3 and Figure 4 shows organizations from a sequence of size 4 and size 3 respectively.

[[1 0 2 0 3 0 4], [1 0 (2 0 3 0 4)], [1 0 (2 0 (3 0 4))], [1 0 ((2 0 3) 0 4)],
 [(1 0 2) 0 (3 0 4)], [(1 0 2 0 3) 0 4], [(1 0 (2 0 3)) 0 4], [((1 0 2) 0 3) 0 4]]

Figure 2: Organizations from a sequence of numbers in increasing order from 1 to 4.

[[(1 0 2 0 3)], [(1 0 (2 0 3))], [((1 0 2) 0 3)]]

Figure 4: All organizations from a sequence of numbers in increasing order from 1 to 3.

There is slight repetition in the parenthesis structure in Figure 3 and 4 where 3 of the indexes in the array of figure 3 can replace a portion of the array representations in Figure 3 shown in Figure 5. TH is the array in Figure 3 ranging from index 1 to 3.

[[1 0 2 0 3 0 4], [1 0 (2 0 3 0 4)], [1 0 (2 0 (3 0 4))], [1 0 ((2 0 3) 0 4)],
 [(1 0 2) 0 (3 0 4)], [TH[1] 0 4], [TH[2] 0 4], [TH[3] 0 4]]

Figure 5: Organizations from a sequence of numbers in increasing order from 1 to 4 containing representations from an array of all organizations from a sequence of increasing numbers in order 1 to 3.

When simplifying the array representations to shorthand we create Figure 6 where TS is all organizations from a set of three numbers.

$$[[N O N O N O N], [N O TS[1]], [N O TS[2]], [N O TS[3]], \\ [(N O N) O (N O N)], [TS[1] O N], [TS[2] O N], [TS[3] O N]]$$

Figure 6: Organizations from a set of four numbers containing representations from an array of all organizations from a set of three numbers.

To determine all organizations we initially set all of the organizations for smaller sets and replace all assumed placeholders for the set of all organizations of that number with all of the organizations in that set. We rewrite the organization as a set of numbers reflecting the sizes of the smaller sets that will contain the all the organizations of the set of numbers of that size. Figure 7 is an example of all organizations of a set of size 4.

$$[[1,1,1,1], [1,3], [2,2], [1,1,2], [2,1,1], [1,2,1], [3,1]]$$

Figure 7: All organizations from a set of four numbers using the size of the number as a placeholder for the organizations of the size of the respective number.

Two main steps build all of the organizations. Initially we gather all of the organizations available from sizes 1 to n , named *ogsize*set. The process for gathering *ogsize*set is through reduction, merging, and rotation. Once we have the *ogsize*set we replace each organization size set by their string-i-fied version insert all of the string values into their respective numerical representation. Algorithm 3 uses those 2 steps to gather all of the organizations.

```

DEFINE OrganizationSet with numbers
  SET ogsizeset to Reduce (numbers.size);
  SET ogsizeset to Merge(ogsizeset);
  SET ogsizeset to Rotate(ogsizeset);
  return StringifyOrganizations(ogsizeset);
END DEFINE

```

Algorithm 3: Pseudocode for finding all organizations from an array of numbers.

4.1 Reduce

Reducing a set of values breaks down a large valued set to several smaller sets. A process of this is shown in Figure 8. The breakdown always starts with a much larger value and then reduces it iteratively by one and moving that single value to the right of the larger value. This is done until the largest value is equal to the value to the right of it, or one. Algorithm 4 describes the process for taking a numerical value as the largest set size and reducing it. *ogs* is the set of numerical organizations created from the reduction process.

```

1.) [5]
2.) [4,1]
3.) [3,1,1]
4.) [2,1,1,1]
5.) [1,1,1,1,1]

```

Figure 8: The Reduction process for a sequence of size 5 providing all possible values from reduction.

```

DEFINE Reduce with n
  SET ogs to [];

  FOR i from 0 -> n
    SET og to [n - i];
  
```

```

FOR j from -> i
  og.Add(1)
  ogs.Add(og)

return og;
END DEFINE

```

Algorithm 4: Pseudocode for deriving organizations by reducing n .

4.2 Merge

Merging takes all organizations of *ogs* from the reduction process and merges the lower values until it equals the greatest value in the organization. Part of this process is shown in Figure 9 given one of the organizations created by the reduction process of a number sequence of size 8. In the figure we have an invisible pointer, p , that we move from one index to the next, initially its set at index 2. In Figure 9 we set p to 2 and merge indexes 2 and 3. p is increased to 3 and indexes 3 and 4 are merged. The value of index 2 and 3 is equal yet less than the greatest value, p is set to index 2 and a transfer of a single value is passed from index 3 to index 2 setting the value of index 2 to the number 3. p increases to index 3 and index 3 and 4 are merged together gathering all possible merge values from the initial reduction organization of [3,1,1,1,1,1]. Algorithm 5 describes the process of merging organizations stepwise until all merge organization sets have been found from the reduction organizations.

- 1.) [3,1,1,1,1,1]
- 2.) [3,2,1,1,1]
- 3.) [3,2,2,1]
- 4.) [3,3,1,1]
- 5.) [3,3,2]

Figure 9: The Merging process for a large value set of 8 providing an example of the merge results from an initial reduction *ogs* value of [3,1,1,1,1,1].

```

DEFINE Merge with iogs
  SET ogs as [];

  FOR i from iogs.length
    ogs += QuickMerge(iog[i])
    ogs += WholeMerge(iog[i])

  return iogs + ogs;
END DEFINE

```

Algorithm 5: Pseudocode for merging organizations from reduction to determine more organizations.

There are two different methods for merging a reduction organization, QuickMerge and WholeMerge. QuickMerge merges the current pointer until its value equals the greatest value of the current organization or until no more values can be merged. If the value of the current pointer is equal to the greatest value and another merge can be made then it increases the pointer value. WholeMerge, shown in Figure 9, increases the pointer when a merge can be made and decreases a pointer when a merge at the pointer location is not possible but may be available at a lower pointer value. Both merge methods, when combined, are able to generate all merges.

```

DEFINE QuickMerge with iog
  SET ogs as [];

```

```

SET og as iog;
SET p as 1;

WHILE MergePossible(og, p)
  og = MergeIndex(og, p);
  ogs.Add(og);
  IF og[p] EQUALS og[0]
    p ++;

return ogs
END DEFINE

```

Algorithm 6: Pseudocode for quickly merging an organization until no more local merges can occur.

```

DEFINE WholeMerge with iog
  SET ogs as [];
  SET og as iog;
  SET p as 1;
  WHILE GlobalMergePossible(og, p)
    IF MergePossible(og, p)
      og = MergeIndex(og, p);
      ogs.Add(og);
      p ++;
    ELSE
      p --;
  return ogs
END DEFINE

```

Algorithm 7: Pseudocode for merging an organization as described in Figure 9.

4.3 Rotate

Rotation occurs when all organizations inside of *ogs* from the merge process are oriented until all possible patterns have occurred for each organization. A complete rotation of the organization will not provide all of the patterns that can occur inside of the organization as swapping indexes may also aid in deriving patterns. An organization of size one can only have a single pattern, an organization of size 2 has 2 patterns, its original and the swap of the first and second index. To derive all possible patterns we take a organization and remove the first index until we are left with a organization of size 2. We then find all patterns of the size 2 organization, append the removed value from the organization and then rotate all newly appended patterns completely until all patterns have been found for each newly pattern appended. Figure 11 gives an example of all of the possible orientations that exist from an initial organization of [1,2,3]. Algorithm 8 describes all of the methods for deriving all rotations from *ogs*.

- 1.) [1,2,3]
 - a. Rotate [2,3]
 - b. Prepend 1 to [2,3] and [3,2]
- 2.) [[2,3,1], [1,2,3], [3,1,2], [3,2,1], [1,3,2], [2,1,3]]

Figure 11: The Rotation process for an organization of [1,2,3].

```

DEFINE Rotate with iogs
  SET ogs to [];

  FOR i from iogs.length
    ogs.Add(Patterns(iogs[i]));
  return ogs;
END DEFINE

```

```

DEFINE Patterns with og
  IF (og.length == 1 || og == og.reverse())
    return [og];
  ELSE IF (og.length == 2)
    return [og, [og[1], og[0]]];
  ELSE
    SET pattern_slices to Patterns(og.slice(1));
    SET all_patterns to [];
    SET temp_pattern to [];
    FOR i from pattern_slices
      compare_pattern to og[0] + pattern_slices[i];
      temp_pattern to compare_pattern;
      DO
        temp_pattern.Add(temp_pattern.shift());
        IF UniqueOrganization(temp_pattern, all_patterns)
          all_patterns.Add(temp_pattern);
        WHILE temp_pattern NOT_EQUAL compare_pattern
      return all_patterns;
    END DEFINE

```

Algorithm 8: Pseudocode for rotating organizations by gathering all of their patterns.

4.4 Stringify

After setting *ogsize*set we stringify each of the numbers from smallest to largest by gathering all of their respective *ogsize*set numerical values and inserting our shorthand values, *N* and *O*. Algorithm 9 shows the method for stringifying a set of organizations while Algorithm 10 describes the insertion process for *ogsize*set of values less than *n*. *sstrogset* is the set of all organizations in shorthand representation, *si* is the size index, *ogset* is the organization set of a specific size, *oi* is the organization index, *size_ogset* is the set of organizations, as a numerical representation, of all sizes indexed by each size. *strogset* is the string organization with all of the organization size values replaced by their respective shorthand representations, *strog* is the set of all organizations at size *si*, *sv* is the searchable value that is to be replaced by all of the organizations that represent the numerical shorthand, *se* is the set of all shorthand representations of the organization size, *sei* is the index of the organization sets string value, and *og_str* is the organization shorthand notation

```

DEFINE stringify with size_ogset
  SET sstrogset as {};

  FOR si from size_ogset
    SET ogset as size_ogset[si];
    sstrogset[si] as [];

    FOR oi from ogset.length
      sstrogset[si].Add(ogset[oi].join(" O ("));

  return GenerateStringOrganizationSet(sstrogset);
END DEFINE

```

Algorithm 9: Pseudocode for stringifying an organization.

```

DEFINE generateStringOrganizationSet with sstrogset
  SET strogset as {}
  SET si as 0;

  FOR si from sstrogset
    SET strog as sstrogset[si];
    strogset[si] as [];

    FOR i from strog.length

```

```

        SET str as strog[i];

    IF si EQUALS 2
        strogset[si].Add(str.replace(1, "N"));
    ELSE
        FOR sv from strog.length to 1
            IF str HAS sv
                SET se as strogset[sv];
                FOR sei from se
                    SET og_str as str.replace(sv, se[sei]);
                    og_str as og_str.replace(1, "N");
                    strogset[si].Add(og_str);
                ELSE
                    strogset[si].Add(str.replace(1, "N"));
            return strogset[si];
        END DEFINE

```

Algorithm 10: Pseudocode for generating the string organization set for the string organization set, *sstrogset*, of size *n*.

5 REPRESENTATION

Representation occurs when an stringified organization contains the number set in sequential order and the operations sequentially from the operation set. Algorithm 11 describes the process of replacing the number set and operations to create a representation. The *organization* is the shorthand representation we defined inside of Algorithm 10, the *operations* are an instance of the returned operations set in Algorithm 2 and the *numbers* are simply the number set determined in the beginning in Algorithm 1.

```

    DEFINE GetRepresentation with organization, operations and numbers
        FOR number from numbers
            organization.replace("N", number)
        FOR operation from operations
            organization.replace("O", operation)
        return organization;
    END DEFINE

```

Algorithm 11: Pseudocode to define the representation from an organization, a number set and a list of operations.

6 SOLUTION

JavaScript Expression Evaluator was used to calculate the solution of a representation. Concatenation was applied at the end of the order of operations in a PEMDAS order set.

7 CONCLUSION

Gathering all of the organizations provides a brute force method for gathering all of the representations for the whole number 10958 with a set of numbers in increasing value from 1 to 9. This method can be used to find all representations for any value of any set of numbers and operations. The current algorithms would need to be modified to operate in parallel to optimize the time complexity of the representation methodology.

8 REFERENCES

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9 ACKNOWLEDGEMENT

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10 10958 REPRESENTATIONS

This is a table of all representations of the whole number 10958 with a number set of 1 to 9 in increasing order with the operations of addition, subtraction, multiplication, division, powers, parenthesis, and concatenation. 1147 representations were found using the methods of crazy sequential representation generation described above.

$(1 \parallel ((2^3) - 4)^5 - ((6 \parallel 7) + 8)) + 9$	$1 \parallel ((2 + (3 + 4^5)) - 6) - 7 * 8 - 9$
$(1 \parallel (2^3 - 4)^5 - (6 \parallel 7 + 8)) + 9$	$1 \parallel ((2 + 3 + (4^5)) - 6) - 7 * 8 - 9$
$1 \parallel ((2^3) - 4)^5 - ((6 \parallel 7) + 8) + 9$	$1 \parallel (((2 + 3) + 4^5) - 6) - 7 * 8 - 9$
$1 \parallel (2^3 - 4)^5 - (6 \parallel 7 + 8) + 9$	$1 \parallel ((2 + 3 + 4^5) - 6) - 7 * 8 - 9$
$(1^2 \wedge 3 \parallel 4^5 - ((6 \parallel 7) + 8)) + 9$	$1 \parallel (((2 + 3) + (4^5)) - 6) - 7 * 8 - 9$
$(1^2 \wedge 3 \parallel 4^5 - (6 \parallel 7 + 8)) + 9$	$1 \parallel (2 + ((3 + (4^5)) - 6)) - 7 * 8 - 9$
$((1^2 \wedge 3) \parallel 4^5 - ((6 \parallel 7) + 8)) + 9$	$1 \parallel (2 + ((3 + 4^5) - 6)) - 7 * 8 - 9$
$((1^2 \wedge 3) \parallel 4^5 - (6 \parallel 7 + 8)) + 9$	$1 \parallel (2 + (3 + ((4^5) - 6))) - 7 * 8 - 9$
$1^2 \wedge 3 \parallel 4^5 - ((6 \parallel 7) + 8) + 9$	$1 \parallel (2 + (3 + (4^5 - 6))) - 7 * 8 - 9$
$1^2 \wedge 3 \parallel 4^5 - (6 \parallel 7 + 8) + 9$	$1 \parallel (2 + (3 + (4^5) - 6)) - 7 * 8 - 9$
$((1^2 \wedge 3) \parallel 4^5 - ((6 \parallel 7) + 8) + 9$	$1 \parallel (2 + (3 + 4^5 - 6)) - 7 * 8 - 9$
$(1^2 \wedge 3) \parallel 4^5 - (6 \parallel 7 + 8) + 9$	$1 \parallel (2 + 3 + ((4^5) - 6)) - 7 * 8 - 9$
$((1^2 + 3) \parallel 4^5 - (6 \parallel 7)) - 8) + 9$	$1 \parallel (2 + 3 + (4^5 - 6)) - 7 * 8 - 9$
$((1^2 + 3) \parallel (4^5) - (6 \parallel 7)) - 8) + 9$	$1 \parallel (2 + (3 + (4^5)) - 6) - 7 * 8 - 9$
$(1^2 + 3) \parallel 4^5 - (6 \parallel 7) - 8) + 9$	$1 \parallel (2 + (3 + 4^5) - 6) - 7 * 8 - 9$
$(1^2 + 3) \parallel (4^5) - (6 \parallel 7) - 8) + 9$	$1 \parallel (2 + 3 + (4^5) - 6) - 7 * 8 - 9$
$(1^2 + 3) \parallel 4^5 - (6 \parallel 7)) - 8 + 9$	$1 \parallel ((2 + 3) + 4^5 - 6) - 7 * 8 - 9$
$(1^2 + 3) \parallel (4^5) - (6 \parallel 7)) - 8 + 9$	$1 \parallel (2 + 3 + 4^5 - 6) - 7 * 8 - 9$
$(1^2 + 3) \parallel 4^5 - (6 \parallel 7) - 8 + 9$	$1 \parallel ((2 + 3) + (4^5) - 6) - 7 * 8 - 9$
$(1^2 + 3) \parallel (4^5) - (6 \parallel 7) - 8 + 9$	$(1 \parallel (2 + (3 + (4^5)))) - 6 - 7 * 8 - 9$
$((1^2 - 3) \parallel 4^5 - (6 \parallel 7)) - 8) + 9$	$(1 \parallel (2 + (3 + 4^5))) - 6 - 7 * 8 - 9$
$((1^2 - 3) \parallel (4^5) - (6 \parallel 7)) - 8) + 9$	$(1 \parallel (2 + 3 + (4^5))) - 6 - 7 * 8 - 9$
$(1^2 - 3) \parallel 4^5 - (6 \parallel 7) - 8) + 9$	$(1 \parallel ((2 + 3) + 4^5)) - 6 - 7 * 8 - 9$
$(1^2 - 3) \parallel (4^5) - (6 \parallel 7) - 8) + 9$	$(1 \parallel (2 + 3 + 4^5)) - 6 - 7 * 8 - 9$
$(1^2 - 3) \parallel 4^5 - (6 \parallel 7)) - 8 + 9$	$(1 \parallel ((2 + 3) + (4^5))) - 6 - 7 * 8 - 9$

$$\begin{aligned}
& (1 \wedge (2 - 3) \parallel (4 \wedge 5) - (6 \parallel 7)) - 8 + 9 \\
& 1 \wedge (2 - 3) \parallel 4 \wedge 5 - (6 \parallel 7) - 8 + 9 \\
& 1 \wedge (2 - 3) \parallel (4 \wedge 5) - (6 \parallel 7) - 8 + 9 \\
& ((1 \wedge (2 * 3) \parallel 4 \wedge 5 - (6 \parallel 7)) - 8) + 9 \\
& ((1 \wedge (2 * 3) \parallel (4 \wedge 5) - (6 \parallel 7)) - 8) + 9 \\
& (1 \wedge (2 * 3) \parallel 4 \wedge 5 - (6 \parallel 7) - 8) + 9 \\
& (1 \wedge (2 * 3) \parallel (4 \wedge 5) - (6 \parallel 7) - 8) + 9 \\
& (1 \wedge (2 * 3) \parallel 4 \wedge 5 - (6 \parallel 7)) - 8 + 9 \\
& (1 \wedge (2 * 3) \parallel (4 \wedge 5) - (6 \parallel 7)) - 8 + 9 \\
& ((1 \wedge 2 \wedge 3 \parallel 4 \wedge 5 - (6 \parallel 7)) - 8) + 9 \\
& ((1 \wedge 2 \wedge 3 \parallel (4 \wedge 5) - (6 \parallel 7)) - 8) + 9 \\
& (((1 \wedge 2) \wedge 3 \parallel 4 \wedge 5 - (6 \parallel 7)) - 8) + 9 \\
& ((1 \wedge (2 \wedge 3) \parallel 4 \wedge 5 - (6 \parallel 7)) - 8) + 9 \\
& (((1 \wedge 2) \wedge 3 \parallel (4 \wedge 5) - (6 \parallel 7)) - 8) + 9 \\
& ((1 \wedge (2 \wedge 3) \parallel (4 \wedge 5) - (6 \parallel 7)) - 8) + 9 \\
& (1 \wedge 2 \wedge 3 \parallel 4 \wedge 5 - (6 \parallel 7) - 8) + 9 \\
& (1 \wedge 2 \wedge 3 \parallel (4 \wedge 5) - (6 \parallel 7) - 8) + 9 \\
& ((1 \wedge 2) \wedge 3 \parallel 4 \wedge 5 - (6 \parallel 7) - 8) + 9 \\
& (1 \wedge (2 \wedge 3) \parallel 4 \wedge 5 - (6 \parallel 7) - 8) + 9 \\
& ((1 \wedge 2) \wedge 3 \parallel (4 \wedge 5) - (6 \parallel 7)) - 8 + 9 \\
& (1 \wedge (2 \wedge 3) \parallel (4 \wedge 5) - (6 \parallel 7)) - 8 + 9 \\
& ((1 \wedge 2 \wedge 3 \parallel 4 \wedge 5 - (6 \parallel 7)) - 8) + 9 \\
& ((1 \wedge (2 \parallel 3) \parallel 4 \wedge 5 - (6 \parallel 7)) - 8) + 9 \\
& ((1 \wedge (2 \parallel 3) \parallel (4 \wedge 5) - (6 \parallel 7)) - 8) + 9 \\
& (1 \wedge (2 \parallel 3) \parallel 4 \wedge 5 - (6 \parallel 7) - 8) + 9 \\
& (1 \wedge (2 \parallel 3) \parallel (4 \wedge 5) - (6 \parallel 7) - 8) + 9 \\
& (1 \wedge (2 \parallel 3) \parallel 4 \wedge 5 - (6 \parallel 7)) - 8 + 9
\end{aligned}$$

$$\begin{aligned}
& 1 \parallel (2 + (3 + (4 \wedge 5))) - 6 - 7 * 8 - 9 \\
& 1 \parallel (2 + (3 + 4 \wedge 5)) - 6 - 7 * 8 - 9 \\
& 1 \parallel (2 + 3 + (4 \wedge 5)) - 6 - 7 * 8 - 9 \\
& 1 \parallel ((2 + 3) + 4 \wedge 5) - 6 - 7 * 8 - 9 \\
& 1 \parallel (2 + 3 + 4 \wedge 5) - 6 - 7 * 8 - 9 \\
& 1 \parallel ((2 + 3) + (4 \wedge 5)) - 6 - 7 * 8 - 9 \\
& 1 \parallel ((2 \wedge (3 + 4)) \parallel 5) - ((6 * (7 * 8)) - 9) \\
& 1 \parallel (2 \wedge (3 + 4) \parallel 5) - (6 * (7 * 8) - 9) \\
& 1 - ((2 - 3) \parallel (4 \wedge 5)) + ((6 \parallel 7) * (8 - 9)) \\
& 1 - (2 - 3 \parallel 4 \wedge 5 - ((6 \parallel 7) * (8 - 9))) \\
& 1 - (((2 - 3) \parallel (4 \wedge 5)) - ((6 \parallel 7) * (8 - 9))) \\
& 1 - (2 - 3 \parallel 4 \wedge 5 - (6 \parallel 7) * (8 - 9)) \\
& 1 - (2 - 3 \parallel (4 \wedge 5) - (6 \parallel 7) * (8 - 9)) \\
& 1 - ((2 - 3) \parallel 4 \wedge 5 - (6 \parallel 7) * (8 - 9)) \\
& 1 - ((2 - 3) \parallel (4 \wedge 5) - (6 \parallel 7) * (8 - 9)) \\
& 1 \parallel (2 + 3 + (4 \wedge 5)) - (6 - 7 + (8 * 9)) \\
& 1 \parallel ((2 + 3) + 4 \wedge 5) - ((6 - 7) + 8 * 9) \\
& 1 \parallel (2 + 3 + 4 \wedge 5) - (6 - 7 + 8 * 9) \\
& 1 \parallel ((2 + 3) + (4 \wedge 5)) - ((6 - 7) + (8 * 9)) \\
& 1 * (2 * ((3 + (4 \parallel 5)) + 6 \parallel (7 + (8 * 9)))) \\
& 1 * (2 * (3 + (4 \parallel 5 + 6) \parallel (7 + 8 * 9))) \\
& 1 * 2 * ((3 + (4 \parallel 5)) + 6 \parallel (7 + (8 * 9))) \\
& 1 * 2 * (3 + (4 \parallel 5 + 6) \parallel (7 + 8 * 9)) \\
& 1 * (2 * (3 * 4 * 5 - 6 \parallel (7 + (8 * 9)))) \\
& 1 * (2 * (3 * 4 * 5 - 6 \parallel (7 + 8 * 9))) \\
& 1 * (2 * ((3 * (4 * 5)) - 6 \parallel (7 + (8 * 9)))) \\
& 1 * (2 * ((3 * 4 * 5) - 6 \parallel (7 + 8 * 9))) \\
& 1 * 2 * (3 * 4 * 5 - 6 \parallel (7 + (8 * 9))) \\
& 1 * 2 * (3 * 4 * 5 - 6 \parallel (7 + 8 * 9)) \\
& 1 * 2 * ((3 * (4 * 5)) - 6 \parallel (7 + (8 * 9))) \\
& 1 * 2 * ((3 * 4 * 5) - 6 \parallel (7 + 8 * 9)) \\
& 1 * (2 \parallel 3 + (((((4 * 5) * 6) \parallel 7) + 8) * 9)) \\
& 1 * (2 \parallel 3 + (((((4 * (5 * 6)) \parallel 7) + 8) * 9)) \\
& 1 * (2 \parallel 3 + (((((4 * 5 * 6) \parallel 7) + 8) * 9)) \\
& 1 * (2 \parallel 3 + (((4 * (5 * 6) \parallel 7) + 8) * 9)) \\
& 1 * (2 \parallel 3 + (((((4 * 5) * 6) \parallel 7) + 8) * 9)) \\
& 1 * (2 \parallel 3 + (((4 * 5 * 6) \parallel 7) + 8) * 9)) \\
& 1 * (2 \parallel 3 + (((((4 * 5) * 6) \parallel 7) + 8) * 9)) \\
& 1 * (2 \parallel 3 + (((4 * (5 * 6)) \parallel 7) + 8) * 9)) \\
& 1 * (2 \parallel 3 + (((4 * 5 * 6) \parallel 7) + 8) * 9))
\end{aligned}$$

$$\begin{aligned}
& (1 \wedge (2 \parallel 3) \parallel (4 \wedge 5) - (6 \parallel 7)) - 8 + 9 \\
& 1 \wedge (2 \parallel 3) \parallel 4 \wedge 5 - (6 \parallel 7) - 8 + 9 \\
& 1 \wedge (2 \parallel 3) \parallel (4 \wedge 5) - (6 \parallel 7) - 8 + 9 \\
& 1 \parallel (2 + (3 + 4 \wedge 5)) - (6 + (7 * 8 + 9)) \\
& 1 \parallel (2 + 3 + 4 \wedge 5) - (6 + 7 * 8 + 9) \\
& (((1 \parallel (2 \wedge (3 + 4))) \parallel 5) - 6 * 7 * 8) + 9 \\
& (((1 \parallel 2 \wedge (3 + 4)) \parallel 5) - 6 * 7 * 8) + 9 \\
& ((1 \parallel ((2 \wedge (3 + 4)) \parallel 5)) - 6 * 7 * 8) + 9 \\
& ((1 \parallel (2 \wedge (3 + 4) \parallel 5)) - 6 * 7 * 8) + 9 \\
& ((1 \parallel (2 \wedge (3 + 4)) \parallel 5) - 6 * 7 * 8) + 9 \\
& ((1 \parallel 2 \wedge (3 + 4) \parallel 5) - 6 * 7 * 8) + 9 \\
& (1 \parallel ((2 \wedge (3 + 4)) \parallel 5) - 6 * 7 * 8) + 9 \\
& (1 \parallel (2 \wedge (3 + 4) \parallel 5) - 6 * 7 * 8) + 9 \\
& ((1 \parallel (2 \wedge (3 + 4))) \parallel 5 - 6 * 7 * 8) + 9 \\
& ((1 \parallel 2 \wedge (3 + 4)) \parallel 5 - 6 * 7 * 8) + 9 \\
& (1 \parallel (2 \wedge (3 + 4)) \parallel 5 - 6 * 7 * 8) + 9 \\
& (1 \parallel 2 \wedge (3 + 4) \parallel 5 - 6 * 7 * 8) + 9 \\
& (1 \parallel (2 \wedge (3 + 4)) \parallel 5 - (6 * (7 * 8))) + 9 \\
& (1 \parallel 2 \wedge (3 + 4) \parallel 5 - (6 * 7) * 8) + 9 \\
& (1 \parallel 2 \wedge (3 + 4) \parallel 5 - 6 * (7 * 8)) + 9 \\
& ((1 \parallel (2 \wedge (3 + 4))) \parallel 5) - 6 * 7 * 8 + 9 \\
& ((1 \parallel 2 \wedge (3 + 4)) \parallel 5) - 6 * 7 * 8 + 9 \\
& (1 \parallel ((2 \wedge (3 + 4)) \parallel 5)) - 6 * 7 * 8 + 9 \\
& (1 \parallel (2 \wedge (3 + 4) \parallel 5)) - 6 * 7 * 8 + 9 \\
& (1 \parallel (2 \wedge (3 + 4)) \parallel 5) - 6 * 7 * 8 + 9 \\
& (1 \parallel 2 \wedge (3 + 4) \parallel 5) - 6 * 7 * 8 + 9 \\
& 1 \parallel ((2 \wedge (3 + 4)) \parallel 5) - 6 * 7 * 8 + 9 \\
& 1 \parallel (2 \wedge (3 + 4) \parallel 5) - 6 * 7 * 8 + 9 \\
& (1 \parallel (2 \wedge (3 + 4))) \parallel 5 - 6 * 7 * 8 + 9 \\
& (1 \parallel 2 \wedge (3 + 4)) \parallel 5 - 6 * 7 * 8 + 9 \\
& 1 \parallel (2 \wedge (3 + 4)) \parallel 5 - 6 * 7 * 8 + 9 \\
& 1 \parallel 2 \wedge (3 + 4) \parallel 5 - 6 * 7 * 8 + 9 \\
& 1 \parallel (2 \wedge (3 + 4)) \parallel 5 - (6 * (7 * 8)) + 9 \\
& 1 \parallel 2 \wedge (3 + 4) \parallel 5 - (6 * 7) * 8 + 9 \\
& 1 \parallel 2 \wedge (3 + 4) \parallel 5 - 6 * (7 * 8) + 9 \\
& 1 - 2 * 3 \wedge 4 + (5 + 6 \parallel (7 * (8 + 9))) \\
& 1 - 2 * 3 \wedge 4 + (5 + 6 \parallel 7 * (8 + 9)) \\
& 1 - 2 * 3 \wedge 4 + ((5 + 6) \parallel 7 * (8 + 9)) \\
& 1 - (2 * 3 \wedge 4 - (5 + 6 \parallel (7 * (8 + 9)))) \\
& 1 - (2 * 3 \wedge 4 - (5 + 6 \parallel 7 * (8 + 9)))
\end{aligned}$$

$$\begin{aligned}
& 1 * (2 \parallel 3 + ((4 * (5 * 6) \parallel 7 + 8) * 9)) \\
& 1 * (2 \parallel 3 + (((4 * 5) * 6 \parallel 7 + 8) * 9)) \\
& 1 * (2 \parallel 3 + ((4 * 5 * 6 \parallel 7 + 8) * 9)) \\
& 1 * (2 \parallel 3 + (((4 * 5) * 6) \parallel 7) + 8) * 9 \\
& 1 * (2 \parallel 3 + (((4 * (5 * 6)) \parallel 7) + 8) * 9) \\
& 1 * (2 \parallel 3 + (((4 * 5 * 6) \parallel 7) + 8) * 9) \\
& 1 * (2 \parallel 3 + ((4 * (5 * 6) \parallel 7) + 8) * 9) \\
& 1 * (2 \parallel 3 + (((4 * 5) * 6 \parallel 7) + 8) * 9) \\
& 1 * (2 \parallel 3 + ((4 * 5 * 6 \parallel 7) + 8) * 9) \\
& 1 * (2 \parallel 3 + (((4 * 5) * 6) \parallel 7 + 8) * 9) \\
& 1 * (2 \parallel 3 + ((4 * (5 * 6)) \parallel 7 + 8) * 9) \\
& 1 * (2 \parallel 3 + ((4 * 5 * 6) \parallel 7 + 8) * 9) \\
& 1 * (2 \parallel 3 + (4 * (5 * 6) \parallel 7 + 8) * 9) \\
& 1 * (2 \parallel 3 + ((4 * 5) * 6 \parallel 7 + 8) * 9) \\
& 1 * (2 \parallel 3 + (4 * 5 * 6 \parallel 7 + 8) * 9) \\
& 1 * 2 \parallel 3 + (((4 * 5) * 6) \parallel 7) + 8) * 9 \\
& 1 * 2 \parallel 3 + (((4 * (5 * 6)) \parallel 7) + 8) * 9 \\
& 1 * 2 \parallel 3 + (((4 * 5 * 6) \parallel 7) + 8) * 9 \\
& 1 * 2 \parallel 3 + (((4 * 5) * 6 \parallel 7) + 8) * 9 \\
& 1 * 2 \parallel 3 + (((4 * 5) * 6) \parallel 7 + 8) * 9 \\
& 1 * 2 \parallel 3 + (((4 * 5) * 6) \parallel 7 + 8) * 9 \\
& 1 * 2 \parallel 3 + (((4 * 5) * 6) \parallel 7 + 8) * 9 \\
& 1 * 2 \parallel 3 + ((4 * (5 * 6) \parallel 7) + 8) * 9 \\
& 1 * 2 \parallel 3 + (((4 * 5) * 6 \parallel 7) + 8) * 9 \\
& 1 * 2 \parallel 3 + ((4 * 5) * 6 \parallel 7 + 8) * 9 \\
& 1 * 2 \parallel 3 + (((4 * 5) * 6) \parallel 7 + 8) * 9 \\
& 1 * 2 \parallel 3 + ((4 * 5 * 6 \parallel 7) + 8) * 9 \\
& 1 * 2 \parallel 3 + (((4 * 5) * 6) \parallel 7 + 8) * 9 \\
& 1 * 2 \parallel 3 + ((4 * 5) * 6 \parallel 7 + 8) * 9 \\
& 1 * 2 \parallel 3 + ((4 * (5 * 6)) \parallel 7 + 8) * 9 \\
& 1 * 2 \parallel 3 + ((4 * 5 * 6) \parallel 7 + 8) * 9 \\
& 1 * 2 \parallel 3 + (4 * (5 * 6) \parallel 7 + 8) * 9 \\
& 1 * 2 \parallel 3 + ((4 * 5) * 6 \parallel 7 + 8) * 9 \\
& 1 * 2 \parallel 3 + (4 * 5 * 6 \parallel 7 + 8) * 9 \\
& (((1 \parallel (2 + (3 + (4 \wedge 5)))) - 6) + 7) - 8 * 9
\end{aligned}$$

[illegible]

$$\begin{aligned}
& (1 \parallel (((2 + 3) + 4^{\wedge} 5) - 6 + 7)) - 8 * 9 \\
& (1 \parallel ((2 + 3 + 4^{\wedge} 5) - 6 + 7)) - 8 * 9 \\
& (1 \parallel (((2 + 3) + (4^{\wedge} 5)) - 6 + 7)) - 8 * 9 \\
& (1 \parallel (2 + 3 + ((4^{\wedge} 5) - 6) + 7)) - 8 * 9 \\
& (1 \parallel (2 + 3 + (4^{\wedge} 5 - 6) + 7)) - 8 * 9 \\
& (1 \parallel (2 + (3 + (4^{\wedge} 5)) - 6 + 7)) - 8 * 9 \\
& (1 \parallel (2 + (3 + 4^{\wedge} 5) - 6 + 7)) - 8 * 9 \\
& (1 \parallel (2 + (3 + (4^{\wedge} 5) - 6) + 7)) - 8 * 9 \\
& (1 \parallel ((2 + 3) + 4^{\wedge} 5 - 6 + 7)) - 8 * 9 \\
& (1 \parallel (2 + 3 + 4^{\wedge} 5 - 6 + 7)) - 8 * 9 \\
& (1 \parallel ((2 + 3) + (4^{\wedge} 5) - 6 + 7)) - 8 * 9 \\
& (1 \parallel (((2 + (3 + (4^{\wedge} 5))) - 6) + 7) - 8 * 9 \\
& (1 \parallel ((2 + (3 + 4^{\wedge} 5)) - 6) + 7) - 8 * 9 \\
& (1 \parallel ((2 + 3 + (4^{\wedge} 5)) - 6) + 7) - 8 * 9 \\
& (1 \parallel (((2 + 3) + 4^{\wedge} 5) - 6) + 7) - 8 * 9 \\
& (1 \parallel ((2 + 3 + 4^{\wedge} 5) - 6) + 7) - 8 * 9 \\
& (1 \parallel (((2 + 3) + (4^{\wedge} 5)) - 6) + 7) - 8 * 9 \\
& (1 \parallel (2 + ((3 + (4^{\wedge} 5)) - 6)) + 7) - 8 * 9 \\
& (1 \parallel (2 + ((3 + 4^{\wedge} 5) - 6)) + 7) - 8 * 9 \\
& (1 \parallel (2 + (3 + ((4^{\wedge} 5) - 6))) + 7) - 8 * 9 \\
& (1 \parallel (2 + (3 + (4^{\wedge} 5 - 6))) + 7) - 8 * 9 \\
& (1 \parallel (2 + (3 + (4^{\wedge} 5) - 6)) + 7) - 8 * 9 \\
& (1 \parallel (2 + (3 + 4^{\wedge} 5 - 6)) + 7) - 8 * 9 \\
& (1 \parallel (2 + 3 + ((4^{\wedge} 5) - 6)) + 7) - 8 * 9 \\
& (1 \parallel (2 + 3 + (4^{\wedge} 5 - 6)) + 7) - 8 * 9 \\
& (1 \parallel (2 + (3 + (4^{\wedge} 5)) - 6) + 7) - 8 * 9 \\
& (1 \parallel (2 + (3 + 4^{\wedge} 5) - 6) + 7) - 8 * 9 \\
& (1 \parallel (2 + 3 + (4^{\wedge} 5) - 6) + 7) - 8 * 9 \\
& (1 \parallel ((2 + 3) + 4^{\wedge} 5 - 6) + 7) - 8 * 9 \\
& (1 \parallel (2 + 3 + 4^{\wedge} 5 - 6) + 7) - 8 * 9 \\
& (1 \parallel ((2 + 3) + (4^{\wedge} 5) - 6) + 7) - 8 * 9 \\
& ((1 \parallel (2 + (3 + (4^{\wedge} 5)))) - 6 + 7) - 8 * 9 \\
& ((1 \parallel (2 + (3 + 4^{\wedge} 5))) - 6 + 7) - 8 * 9 \\
& ((1 \parallel (2 + 3 + (4^{\wedge} 5))) - 6 + 7) - 8 * 9 \\
& ((1 \parallel ((2 + 3) + 4^{\wedge} 5)) - 6 + 7) - 8 * 9 \\
& ((1 \parallel (2 + 3 + 4^{\wedge} 5)) - 6 + 7) - 8 * 9 \\
& ((1 \parallel ((2 + 3) + (4^{\wedge} 5))) - 6 + 7) - 8 * 9 \\
& (1 \parallel (2 + (3 + (4^{\wedge} 5))) - 6 + 7) - 8 * 9 \\
& (1 \parallel (2 + (3 + 4^{\wedge} 5)) - 6 + 7) - 8 * 9 \\
& (1 \parallel (2 + 3 + (4^{\wedge} 5)) - 6 + 7) - 8 * 9
\end{aligned}$$

[illegible]

$1 + (2 * (3 * (4 * 5) - 6 \parallel 7) \parallel 8 + 9)$
 $1 + (2 * ((3 * 4) * 5 - 6 \parallel 7) \parallel 8 + 9)$
 $1 + (2 * (3 * 4 * 5 - 6 \parallel 7) \parallel 8 + 9)$
 $1 + ((2 * (((3 * 4) * 5) - 6) \parallel 7)) \parallel 8 + 9$
 $1 + ((2 * (((3 * (4 * 5)) - 6) \parallel 7)) \parallel 8) + 9$
 $1 + ((2 * (((3 * 4 * 5) - 6) \parallel 7)) \parallel 8) + 9$
 $1 + ((2 * ((3 * (4 * 5) - 6) \parallel 7)) \parallel 8) + 9$
 $1 + ((2 * (((3 * 4) * 5 - 6) \parallel 7)) \parallel 8) + 9$
 $1 + ((2 * ((3 * 4 * 5 - 6) \parallel 7)) \parallel 8) + 9$
 $1 + ((2 * (((3 * 4) * 5) - 6) \parallel 7)) \parallel 8 + 9$
 $1 + ((2 * ((3 * (4 * 5)) - 6) \parallel 7)) \parallel 8 + 9$
 $1 + ((2 * ((3 * 4 * 5) - 6 \parallel 7)) \parallel 8) + 9$
 $1 + ((2 * (3 * (4 * 5) - 6 \parallel 7)) \parallel 8) + 9$
 $1 + ((2 * (((3 * 4) * 5 - 6) \parallel 7)) \parallel 8) + 9$
 $1 + ((2 * ((3 * 4 * 5 - 6) \parallel 7)) \parallel 8) + 9$
 $1 + ((2 * (((3 * 4) * 5) - 6) \parallel 7)) \parallel 8 + 9$
 $1 + ((2 * ((3 * (4 * 5)) - 6) \parallel 7)) \parallel 8 + 9$
 $1 + ((2 * ((3 * 4 * 5) - 6 \parallel 7)) \parallel 8) + 9$
 $1 + ((2 * (3 * (4 * 5) - 6 \parallel 7)) \parallel 8) + 9$
 $1 + ((2 * ((3 * 4) * 5 - 6 \parallel 7)) \parallel 8) + 9$
 $1 + (2 * (3 * 4 * 5 - 6 \parallel 7) \parallel 8) + 9$
 $1 \parallel (((2^3 - 4)^5) - ((6 \parallel 7) + 8) - 9)$
 $1 \parallel ((2^3 - 4)^5) - ((6 \parallel 7 + 8) - 9)$
 $1^2 \wedge 3 \parallel 4^5 - (((6 \parallel 7) + 8) - 9)$
 $1^2 \wedge 3 \parallel 4^5 - ((6 \parallel 7 + 8) - 9)$
 $1^2 \wedge 3 \parallel 4^5 - (6 \parallel ((7 + 8) - 9))$
 $1^2 \wedge 3 \parallel 4^5 - (6 \parallel (7 + (8 - 9)))$
 $1^2 \wedge 3 \parallel 4^5 - (6 \parallel (7 + 8 - 9))$
 $1^2 \wedge 3 \parallel 4^5 - (6 \parallel 7 + (8 - 9))$
 $1^2 \wedge 3 \parallel 4^5 - ((6 \parallel 7) + 8 - 9)$
 $1^2 \wedge 3 \parallel 4^5 - (6 \parallel 7 + 8 - 9)$
 $1^2 \wedge 3 \parallel 4^5 - ((6 \parallel 7) + (8 - 9))$
 $1^2 \wedge 3 \parallel 4^5 - (6 \parallel 7) - (8 - 9)$
 $1^2 \wedge 3 \parallel 4^5 - (6 \parallel 7) - (8 - 9)$

$1 - 2 - 3 + (4 + (5 + 6 \parallel 7) \parallel 8) * 9$
 $1 - (2 + (3 - (((4 + ((5 + 6) \parallel 7)) \parallel 8) * 9)))$
 $1 - (2 + (3 - (((4 + (5 + 6 \parallel 7)) \parallel 8) * 9)))$
 $1 - (2 + (3 - ((4 + ((5 + 6) \parallel 7) \parallel 8) * 9)))$
 $1 - (2 + (3 - ((4 + (5 + 6 \parallel 7) \parallel 8) * 9)))$
 $1 - (2 + (3 - ((4 + ((5 + 6) \parallel 7)) \parallel 8) * 9))$
 $1 - (2 + (3 - ((4 + (5 + 6 \parallel 7)) \parallel 8) * 9))$
 $1 - (2 + (3 - (4 + ((5 + 6) \parallel 7) \parallel 8) * 9))$
 $1 - (2 + (3 - (4 + (5 + 6 \parallel 7) \parallel 8) * 9))$
 $1 - (2 + 3 - (((4 + ((5 + 6) \parallel 7)) \parallel 8) * 9))$
 $1 - (2 + 3 - (((4 + (5 + 6 \parallel 7)) \parallel 8) * 9))$
 $1 - (2 + 3 - ((4 + ((5 + 6) \parallel 7) \parallel 8) * 9))$
 $1 - (2 + 3 - ((4 + (5 + 6 \parallel 7) \parallel 8) * 9))$
 $1 - (2 + 3 - ((4 + ((5 + 6) \parallel 7)) \parallel 8) * 9)$
 $1 - (2 + 3 - ((4 + (5 + 6 \parallel 7) \parallel 8) * 9))$
 $1 - (2 + 3 - (4 + ((5 + 6) \parallel 7) \parallel 8) * 9)$
 $1 - (2 + 3 - (4 + (5 + 6 \parallel 7) \parallel 8) * 9)$
 $1 - (2 + 3 - (4 + (5 + 6 \parallel 7) \parallel 8) * 9)$
 $1 - 2 - (3 - (((4 + ((5 + 6) \parallel 7)) \parallel 8) * 9))$
 $1 - 2 - (3 - (((4 + (5 + 6 \parallel 7)) \parallel 8) * 9))$
 $1 - 2 - (3 - ((4 + ((5 + 6) \parallel 7) \parallel 8) * 9))$
 $1 - 2 - (3 - ((4 + (5 + 6 \parallel 7) \parallel 8) * 9))$
 $1 - 2 - (3 - ((4 + ((5 + 6) \parallel 7)) \parallel 8) * 9)$
 $1 - 2 - (3 - ((4 + (5 + 6 \parallel 7)) \parallel 8) * 9)$
 $1 - 2 - (3 - (4 + ((5 + 6) \parallel 7) \parallel 8) * 9)$
 $1 - 2 - (3 - (4 + (5 + 6 \parallel 7) \parallel 8) * 9)$
 $1 \parallel (2 \parallel (3 * 4)) * 5 - 6 - (7 + (8 \parallel 9))$
 $1 * (2 * (((((3 + 4) * (5 + 6)) * 7) + 8) \parallel 9))$
 $1 * (2 * (((((3 + 4) * (5 + 6) * 7) + 8) \parallel 9))$
 $1 * (2 * (((((3 + 4) * (5 + 6)) * 7 + 8) \parallel 9))$
 $1 * (2 * (((3 + 4) * (5 + 6) * 7 + 8) \parallel 9))$
 $1 * (2 * (((3 + 4) * (5 + 6) * 7 + 8) \parallel 9))$
 $1 * (2 * (((3 + 4) * (5 + 6) * 7 + 8) \parallel 9))$
 $1 * (2 * (((3 + 4) * (5 + 6) * 7 + 8) \parallel 9))$
 $1 * 2 * (((((3 + 4) * (5 + 6)) * 7) + 8) \parallel 9)$
 $1 * 2 * (((((3 + 4) * (5 + 6) * 7) + 8) \parallel 9))$
 $1 * 2 * (((((3 + 4) * (5 + 6)) * 7 + 8) \parallel 9))$
 $1 * 2 * (((3 + 4) * (5 + 6) * 7 + 8) \parallel 9))$
 $1 * 2 * (((3 + 4) * (5 + 6) * 7 + 8) \parallel 9)$
 $1 * 2 * (((3 + 4) * (5 + 6) * 7 + 8) \parallel 9)$

$((1 \parallel (2 + 3 + 4^5)) - 6) - 7 * 8 - 9$
 $((1 \parallel ((2 + 3) + (4^5))) - 6) - 7 * 8 - 9$
 $(1 \parallel ((2 + (3 + (4^5))) - 6)) - 7 * 8 - 9$
 $(1 \parallel ((2 + (3 + 4^5)) - 6)) - 7 * 8 - 9$
 $(1 \parallel ((2 + 3 + (4^5)) - 6)) - 7 * 8 - 9$
 $(1 \parallel (((2 + 3) + 4^5) - 6)) - 7 * 8 - 9$
 $(1 \parallel ((2 + 3 + 4^5) - 6)) - 7 * 8 - 9$
 $(1 \parallel (((2 + 3) + (4^5)) - 6)) - 7 * 8 - 9$
 $(1 \parallel (2 + ((3 + (4^5)) - 6))) - 7 * 8 - 9$
 $(1 \parallel (2 + ((3 + 4^5) - 6))) - 7 * 8 - 9$
 $(1 \parallel (2 + (3 + ((4^5) - 6)))) - 7 * 8 - 9$
 $(1 \parallel (2 + (3 + (4^5 - 6)))) - 7 * 8 - 9$
 $(1 \parallel (2 + (3 + (4^5) - 6))) - 7 * 8 - 9$
 $(1 \parallel (2 + (3 + 4^5 - 6))) - 7 * 8 - 9$
 $(1 \parallel (2 + 3 + ((4^5) - 6))) - 7 * 8 - 9$
 $(1 \parallel (2 + 3 + (4^5 - 6))) - 7 * 8 - 9$
 $(1 \parallel (2 + (3 + (4^5)) - 6)) - 7 * 8 - 9$
 $(1 \parallel (2 + (3 + 4^5) - 6)) - 7 * 8 - 9$
 $(1 \parallel (2 + 3 + (4^5) - 6)) - 7 * 8 - 9$
 $(1 \parallel ((2 + 3) + 4^5 - 6)) - 7 * 8 - 9$
 $(1 \parallel (2 + 3 + 4^5 - 6)) - 7 * 8 - 9$
 $(1 \parallel ((2 + 3) + (4^5) - 6)) - 7 * 8 - 9$
 $(1 \parallel (2 + (3 + (4^5)) - 6)) - 7 * 8 - 9$
 $(1 \parallel (2 + (3 + 4^5)) - 6) - 7 * 8 - 9$
 $(1 \parallel (2 + 3 + (4^5)) - 6) - 7 * 8 - 9$
 $(1 \parallel (2 + 3 + (4^5)) - 6) - 7 * 8 - 9$
 $(1 \parallel ((2 + 3) + 4^5) - 6) - 7 * 8 - 9$
 $(1 \parallel (2 + 3 + 4^5) - 6) - 7 * 8 - 9$
 $(1 \parallel ((2 + 3) + (4^5)) - 6) - 7 * 8 - 9$
 $1 \parallel ((2 + (3 + (4^5))) - 6) - 7 * 8 - 9$

$1 * 2 * ((3 - (4 * ((5 - 6) \parallel 7) * 8)) \parallel 9)$
 $1 * 2 * ((3 - (4 * (5 - 6 \parallel 7) * 8)) \parallel 9)$
 $1 * 2 * ((3 - 4 * (((5 - 6) \parallel 7) * 8)) \parallel 9)$
 $1 * 2 * ((3 - 4 * ((5 - 6 \parallel 7) * 8)) \parallel 9)$
 $1 * 2 * ((3 - (4 * ((5 - 6) \parallel 7)) * 8) \parallel 9)$
 $1 * 2 * ((3 - (4 * (5 - 6 \parallel 7)) * 8) \parallel 9)$
 $1 * 2 * ((3 - 4 * ((5 - 6) \parallel 7) * 8) \parallel 9)$
 $1 * 2 * ((3 - 4 * ((5 - 6) \parallel 7) * 8) \parallel 9)$
 $1 * 2 * ((3 - 4 * (5 - 6 \parallel 7) * 8) \parallel 9)$
 $1 * 2 * (3 - (4 * (((5 - 6) \parallel 7) * 8) \parallel 9))$
 $1 * 2 * (3 - (4 * (((5 - 6 \parallel 7) * 8) \parallel 9)))$
 $1 * 2 * (3 - (4 * (((5 - 6) \parallel 7) * 8 \parallel 9)))$
 $1 * 2 * (3 - (4 * ((5 - 6 \parallel 7) * 8 \parallel 9)))$
 $1 * 2 * (3 - 4 * (((5 - 6) \parallel 7) * 8) \parallel 9)$
 $1 * 2 * (3 - 4 * (((5 - 6 \parallel 7) * 8) \parallel 9))$
 $1 * 2 * (3 - 4 * (((5 - 6) \parallel 7) * 8 \parallel 9))$
 $1 * 2 * (3 - 4 * ((5 - 6 \parallel 7) * 8 \parallel 9))$
 $1 * 2 * (3 - ((4 * ((5 - 6) \parallel 7)) * 8) \parallel 9)$
 $1 * 2 * (3 - ((4 * (5 - 6 \parallel 7)) * 8) \parallel 9)$
 $1 * 2 * (3 - (4 * (((5 - 6) \parallel 7) * 8)) \parallel 9)$
 $1 * 2 * (3 - (4 * ((5 - 6 \parallel 7) * 8)) \parallel 9)$
 $1 * 2 * (3 - (4 * ((5 - 6) \parallel 7) * 8) \parallel 9)$
 $1 * 2 * (3 - (4 * (5 - 6 \parallel 7) * 8) \parallel 9)$
 $1 * 2 * (3 - 4 * (((5 - 6) \parallel 7) * 8) \parallel 9)$
 $1 * 2 * (3 - 4 * ((5 - 6 \parallel 7) * 8) \parallel 9)$
 $1 * 2 * (3 - (4 * ((5 - 6) \parallel 7)) * 8 \parallel 9)$
 $1 * 2 * (3 - (4 * (5 - 6 \parallel 7)) * 8 \parallel 9)$
 $1 * 2 * (3 - 4 * ((5 - 6) \parallel 7) * 8 \parallel 9)$
 $1 * 2 * (3 - 4 * (5 - 6 \parallel 7) * 8 \parallel 9)$