* 1. 2. Trace and evaluate the following postfix expressions:
  2. a. 3 8 + 10 3 - \*
  3. b. 2 3 ^ 4 ^
  4. c. 8 2 + 10 - 10
  5. d. 15 3 / 5 10 – / 100 ^
  6. e. 25 4 \* 20 15 - / 2 / 18 +

Using the following table format, show the content of the stack after each step of the evaluation:

* 1. a. 3 8 + 10 3 - \*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Expression | 3 | 8 | + | 10 | 3 | - | \* |  |  |
| Stack |  |  |  |  |  |  |  |  |  |
|  |  |  |  | 3 |  |  |  |  |
|  | 8 |  | 10 | 10 | 7 |  |  |  |
| 3 | 3 | 11 | 11 | 11 | 11 | 77 |  |  |

* 1. b. 2 3 ^ 4 ^

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Expression | 2 | 3 | ^ | 4 | ^ |  |  |  |  |
| Stack |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  | 3 |  | 4 |  |  |  |  |  |
| 2 | 2 | 8 | 8 | 4096 |  |  |  |  |

* 1. c. 8 2 + 10 - 10

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Expression | 8 | 2 | + | 10 | - | 10 |  |  |  |
| Stack |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  | 2 |  | 10 |  | 10 |  |  |  |
| 8 | 8 | 10 | 10 | 0 | 0 |  |  |  |

Invalid Postfix Expression (Too many values left on the stack)

* 1. d. 15 3 / 5 10 – / 100 ^

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Expression | 15 | 3 | / | 5 | 10 | - | / | 100 | ^ |
| Stack |  |  |  |  |  |  |  |  |  |
|  |  |  |  | 10 |  |  |  |  |
|  | 3 |  | 5 | 5 | -5 |  | 100 |  |
| 15 | 15 | 5 | 5 | 5 | 5 | -1 | -1 | 1 |

* 1. e. 25 4 \* 20 15 - / 2 / 18 +

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Expression | 25 | 4 | \* | 20 | 15 | - | / | 2 | / | 18 | + |
| Stack |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  | 15 |  |  |  |  |  |  |
|  | 4 |  | 20 | 20 | 5 |  | 2 |  | 18 |  |
| 25 | 25 | 100 | 100 | 100 | 100 | 20 | 20 | 10 | 10 | 28 |