DownUnder CTF:

1. The bridgekeepers 3rd question:
    a. The problem provides a link that leads you to a web page that ask 3 questions after clicking the text on screen:
        i. What is your name?
        ii. What is your quest?
        iii. What is your favorite color?
    b. When inspecting the HTML one can see that the first two questions don't matter, only the last one, in addition one can find a link to a YouTube video that gives you the answer for the last question, this being "blue".
    c. Unfortunately, this doesn't provide you with the flag when you type it, the real problem is in the Javascript script.

```
prompt = function (fun, x) {
  let answer = fun(x);

  if (!/^[a-z]{13}$/.exec(answer)) return "";

  let a = [], b = [], c = [], d = [], e = [], f = [], g = [], h = [], i = [], j = [], k = [], l = [], m = [];
  let n = "blue";
  a.push(a, a, a, a, a, a, a, a, a, a, a, a, a, a, a, a, b, a, a, a, a, a, a, a, a);
  b.push(b, b, b, b, c, b, a, a, b, b, a, b, a, b, a, a, b, a, b, a, a, b, a, b, b);
  c.push(a, d, b, c, a, a, a, c, b, b, b, a, b, c, a, b, b, a, c, c, b, a, b, a, c, c);
  d.push(c, d, c, c, e, d, d, c, c, c, c, b, c, c, d, c, b, d, a, d, c, c, c, a, d, c);
  e.push(a, e, f, c, d, e, a, e, c, d, c, c, c, d, a, e, b, b, a, d, c, e, b, b, a, a);
  f.push(f, d, g, e, d, e, d, c, b, f, f, f, a, f, e, f, f, d, a, b, b, b, f, f, a, f);
  g.push(h, a, c, c, g, c, b, a, g, e, e, c, g, e, g, g, b, d, b, b, c, c, d, e, b, f);
  h.push(c, d, a, e, c, b, f, c, a, e, a, b, a, g, e, i, g, e, g, h, d, b, a, e, c, b);
  i.push(h, a, d, b, d, c, d, b, f, a, b, b, i, d, g, a, a, a, h, i, j, c, e, f, d, d);
  j.push(b, f, c, f, i, c, b, b, c, j, i, e, e, j, g, j, c, k, c, i, h, g, g, g, a, d);
  k.push(i, k, c, h, h, j, c, e, a, f, f, h, e, g, c, l, c, a, e, f, d, c, f, f, a, h);
  l.push(j, k, j, a, a, i, i, c, d, c, a, m, a, g, f, j, j, k, d, g, l, f, i, b, f, l);
  m.push(c, c, e, g, n, a, g, k, m, a, h, h, l, d, d, g, b, h, d, h, e, l, k, h, k, f);

  walk = a;

  for (let c of answer) {
    walk = walk[c.charCodeAt() - 97];
  }

  if (walk != "blue") return "";

  return {toString: () => _ = window._ ? answer : "blue"};

}.bind(null, prompt);

eval(document.getElementById('challenge').innerText);
```

    d. In the script one can find 14 variables representing the first 14 letters of the alphabet and each one is initialized with an empty array except the letter "n" that has the string "blue".
    e. With the empty arrays a matrix is built and in each row there is only one reference to the row under it, for example, in a[17] = b and it's the only one.
    f. The goal is to reach the letter "n" in the last row since it has the string "blue" so there must be a way to traverse it, that's where the for loop comes in.
    g. The variable named "walk" is initialized with the array "a" and in the loop we can see that it iterates through "answer" this being the word you write on the last question on the web page, so for each character in that word it takes the ASCII code value and subtracts 97 to it and that becomes the new index for "walk".
    h. The goal is to create a word where the decimal ASCII code minus 97 equals the desired index that points to the reference of the column under it until it gets to "n"

where the real answer is located as mentioned before. For example, the first letter of the word should be “r” since the decimal ASCII code is 114 and this value minus 97 equals 17. Using this value a[17] = b, the variable “walk” points to the array “b” or the row under a.

i. The positions we are looking for or the path should be: 17, 4, 1, 4, 2, 2, 0, 15, 20, 17, 15, 11, and 4.
j. Using this equation $x = y + 97$, where y represents the positions, we can find the characters for the word with an ASCII table since x represents the decimal ASCII code.
k. As a result, we get the word “rebeccapurple”.
l. Go back to the webpage, get to the third question, and write the word to get the flag.
m. DUCTF{rebeccapurple}