

White Belt Exam

Your name: _____ Email ID: _____

This exam is your first opportunity to earn a white belt. Students who pass it will be ready to move on to earning a yellow belt; if you do not pass it, you will have other opportunities to earn the white belt.

Closed Resources, No Help. For this exam you should **work on your own** and are not permitted to use any resources other than your own mind and body, and a simple writing implement.

Answer well. Answer all 5 questions. Your answers should be clear, correct, and concise.

Required Questions

1. What is a *computer*?

2. What are the *primitives* in the invented English word “*embiggen*”?

3. How many different strings can the following BNF grammar produce?

Sentence ::= **I** *Emotion* *Food*

Emotion ::= **love**

Emotion ::= **hate**

Food ::= **Bagels**

Food ::= **Donuts**

4. Consider this excerpt from the Python language grammar (similar to Lesson 1 of cs101):

Expression ::= *Expression Operator Expression*

Expression ::= *Number*

Operator ::= +

Operator ::= *

Number = 0, 1, 2

Circle all the strings below that can be produced by *Expression* from just this grammar:

0

1 + 1 + 2 + 0

1 1

+ 2

5. Write a sequence of Python statements that will result in the variable `sindex` holding the index of the second occurrence of the string given in the variable `match` in string given in the variable `quote`.

```
quote = 'In general we are least aware of what our minds do best. (Marvin Minsky) '
match = 'are'
```

```
# write the code that goes here
```

After your code executes, the value in `sindex` should be the index in the original `quote` string where the second occurrence of `match` occurs. The given values of `quote` and `match` here are just examples; your code should work for any starting string values in these variables. (For this, you don't need to worry about what happens if the `quote` does not include two occurrences of `match`.)

For reference, here are the descriptions of the string find functions (from the cs101 notes):

`find: <Search String>.find(<Target String>)` returns a *Number*.

- Returns a number giving the position in `<Search String>` where `<Target String>` first appears. If there is no occurrence of `<Target String>` in `<Search String>`, returns -1.

`find after: <Search String>.find(<Target String>, <Start Index>)` returns a *Number*

- Returns a number giving the position in `<Search String>` where `<Target String>` first appears that is at or after the position given by `<Start Index>`. If there is no occurrence of `<Target String>` in `<Search String>` at or after `<Start Number>`, outputs -1.