



Types

TOTAL POINTS 10

1. What is abstraction?

1 point

- ☐ Writing pseudocode.
- ☐ The act of moving from concrete examples to more general cases.
- ☒ The separation of what something does from how it does it.
- ☐ The removal the non-essential parts of a program.

2. What is a string?

1 point

- ☐ A fragment of code with no control statements
- ☐ A chain of computations affecting the same variable
- ☒ A sequence of characters
- ☐ A pattern of bits with an odd number of ones.

3. Which of the following is NOT determined by the type of a variable?

1 point

- ☐ The number of bits needed to store it in memory.
- ☐ How to interpret the stored bits.
- ☒ The scope of the variable.
- ☐ None of the above. (All of the above are determined by type.)

4. For the following code, assuming a short integer is 16 bits,

1 point

```
1 short y = 30000;  
2 short x = y + 10000;
```

Which one of the following best describes the types present?

- ☐ The short y overflows when it is first initialized.
- ☐ The expression $y + 10000$ is an integer, and overflow occurs assigning to the short x.
- ☒ The expression $y + 10000$ is a short, and no overflow occurs assigning to the short x.
- ☐ The expression $y + 10000$ is a short, and overflow occurs assigning to the short x.

5. What is the value of the character 'l' in binary?

1 point

00100001

6. What is the largest value that can be represented by a 32-bit int, expressed in hex? (Be sure to prepend your answer with "0x", and write any letters as capitals)

1 point

0x7FFFFFFF

7. What is the output of the following code?

1 point

```
1 double d = 4.669;  
2 printf("My number is %.2f.", d);
```

My number is 4.67.

8. For the following code,

1 point

```
1 int x = 5;  
2 double d1 = 11/x;  
3 double d2 = 11/(double)x;
```

What is the value of **d1 - d2**?

- ☐ -2.2
☒ -0.2
☐ 0
☐ 0.2
☐ 2.2

9. For the following code with an enumerated type,

1 point

```

1 enum fruit_tag {
2     BLUEBERRY,
3     BANANA,
4     PINEAPPLE,
5     WATERMELON
6 };
7 typedef enum fruit_tag fruit_t;
8
9 void printFruit(fruit_t myFruit) {
10     switch(myFruit) {
11         case BLUEBERRY:
12             printf("a blueberry");
13             break;
14         case BANANA:
15             printf("a banana");
16             break;
17         case PINEAPPLE:
18             printf("a pineapple");
19             break;
20         case WATERMELON:
21             printf("a watermelon");
22             break;
23     }
24 }
25
26 void compareFruit(fruit_t fruit1, fruit_t fruit2) {
27     if (fruit1 > fruit2) {
28         printFruit(fruit1);
29         printf(" is larger than ");
30         printFruit(fruit2);
31     }
32     else {
33         printFruit(fruit1);
34         printf(" is smaller than ");
35         printFruit(fruit2);
36     }
37 }
38
39 int main(void) {
40     fruit_t myFruit = BANANA;
41     fruit_t otherFruit = WATERMELON;
42     compareFruit(myFruit, otherFruit);
43     return 0;
44 }
  
```

What is the output?

a banana is smaller than a watermelon

10. For the following code,

1 point

```

1 enum name_tag {
2     BLUEBERRY,
3     BANANA,
4     PINEAPPLE,
5     WATERMELON
6 };
7 typedef enum name_tag name_t;
8
9 struct fruit_tag {
10     name_t name;
11     double size;
12 };
13 typedef struct fruit_tag fruit_t;
14
15 fruit_t getBigger(fruit_t f, double d) {
16     f.size += d;
17     return f;
18 }
19
20 int main(void) {
21     fruit_t myFruit;
22     myFruit.name = BANANA;
23     myFruit.size = 5.2;
24     myFruit = getBigger(myFruit, 3.4);
25     printf("This fruit is %.2f grams.\n", myFruit.size);
26     return 0;
27 }
  
```

What is the output?

This Fruit is 8.60 grams.

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