

# Exercises about Computer Science

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## 1 Exercises

1. Encontre a derivada das seguintes funções, utilizando a *Regra da Cadeia*:

(a)  $f(x) = \sqrt{5x+1}$

(b)  $g(\theta) = \cos^2 \theta$

(c)  $y = e^{\tan(\theta)}$

(d)  $f(t) = t \sin(\pi t)$

(e)  $y = x^x$

2. An OR gate has 6 inputs. How many input words are in its truth table?

(a) 64

(b) 32

(c) 16

(d) 128

(e) None of the above

3. What is the 2's-complement representation of -24 in a 16-bit microcomputer?

(a) 0000 0000 0001 1000

(b) 1111 1111 1110 0111

(c) 1111 1111 1110 1000

(d) 0001 0001 1111 0011

(e) None of the above

4. Which gate is known as a universal gate?

(a) NOT gate

(b) AND gate

- (c) NAND gate
  - (d) XOR gate
  - (e) None of the above
5. What is the abbreviation of "binary digit"?
- (a) 0 and 1.
  - (b) Byte.
  - (c) Bit.
  - (d) Bin.
  - (e) Base.
6. On C programming there is a common used structure defined as (void \*) 0. What is it?
- (a) The NULL pointer.
  - (b) The void pointer.
  - (c) Error.
  - (d) Garbage value stored on RAM.
  - (e) Garbage value stored on disk.
7. If a variable is a pointer to a structure, then which of the following operator is used to access data members of the structure through the pointer variable?
- (a) .
  - (b) %
  - (c) &
  - (d) \*
  - (e) -i
8. What will be the output of the following code?

```
#include<stdio.h>

int main()
{
    char str20 = "Hello";
    char *const p=str;
    *p='M';
    printf("%s\n", str);
    return 0;
}
```

- (a) Hello
- (b) Mello
- (c) HMello
- (d) MHello
- (e) Mehlllo

9. What will be the output of the following code?

```
#include<stdio.h>

int main()
{
    char *str;
    str = "%s";
    printf(str, "K\n");
    return 0;
}
```

- (a) Error.
- (b) No output.
- (c) K.
- (d) %s
- (e) K \n

10. What will be the output of the program if the size of pointer is 4-bytes?

```
#include<stdio.h>

int main()
{
    printf("%d, %d\n", sizeof(NULL), sizeof(""));
    return 0;
}
```

- (a) 2, 1.
- (b) 1, 2.
- (c) 2, 2.
- (d) 4, 1.
- (e) 4, 2.

## 2 Answers

1. (a)  $f'(x) = \frac{5}{2\sqrt{5x+1}}$   
(b)  $g'(\theta) = -2\sin(\theta)\cos(\theta)$   
(c)  $y' = e^{\tan(\theta)}\sec^2(\theta)$   
(d)  $f'(t) = \sin(\pi t) + \pi t \cos(\pi t)$   
(e)  $y' = x^x(\ln(x) + 1)$
2. A
3. C
4. C
5. D
6. A
7. E
8. B
9. C
10. D