

## I. Choose The Right Answer

1. Which of following is an illegal user-define symbol? A.  
 A) const B) \_g3 C) COM D) vars  
*reserved letter: 保留字*
2. Assuming all variables are integers, the value of the expression  $(a = 3, b = 5, a + b ++, a += b)$  is B.  
 A) 8 B) 9 C) 6 D) 3  
*逗号表达式: 从左到右计算, 返回值是最后一个表达式之值.*  
 calculate  $a=3$   
 calculate  $b=5$   
 calculate  $a+b++$   $a=3$   $b=6$   
 calculate  $a+=b$   $a=9$   $b=6$   
 return value: 9.
3. Which one is equivalent to the following code block? A.  

```
while (a) {
    if(b) continue;
    c;
}
```

*结束当前循环, 开始下一轮循环!*  
 A) while (a) { if (!b) c; } B) while (c) { if (!b) break; c; }  
 C) while (c) { if (b) c; } D) while (a) { if (b) break; c; }
4. According to the precedence of operation, which one is the right order in descending sort. B.  
 A) Arithmetic Operations, Assignment Operations, Relational Operations  
 B) Arithmetic Operations, Relational Operations, Assignment Operations  
 C) Relational Operations, Assignment Operations, Arithmetic Operations  
 D) Relational Operations, Arithmetic Operations, Assignment Operations  
*p.s. Arithmetic operations > shift operation > Relational operations > Bits operations > Logical operations > Assignment operations*
5. Choose the wrong definition for the character strings. A.  
 A) char str[5] = "QUST"; ('\\0') B) char str[] = "QUST";  
 C) char \*str = "QUST"; D) char str[] = {'Q', 'U', 'S', 'T', '\\0'};  
*"QUST" is a string constant!*
6. Determine the output of the following program. B.  

```
#include<stdio.h>
#include<string.h>
int main() {
    char *s1="AbDeG";
    char *s2="AbdEg";
    s1+=2; s2+=2;
    printf("%d\\n", strcmp(s1,s2));
}
```

*strcmp(s1,s2): if (s1>s2). return a positive number  
 if (s1<s2) return a negative number  
 if (s1==s2) return zero.  
 s1+=2  $\Rightarrow$  \*s1 points to the third char in "AbDeG"  
 since "DeG" < "dEg", strcmp(s1,s2) return a negative number*  
 A) a positive number B) a negative number C) zero D) It depends.

7. Determine the output of the following program. C.

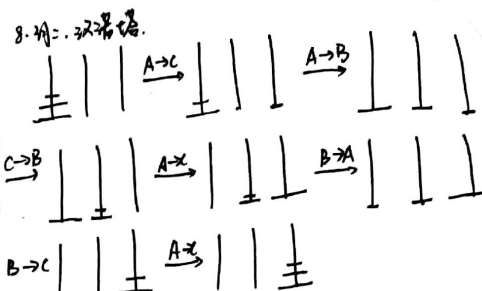
```
#include<stdio.h>
int main(){
    int a[6][6], i, j;
    for(i=1; i<6; i++)
        for(j=1; j<6; j++)
            a[i][j] = (i/j) * (j/i);
    for(i=1; i<6; i++) {
        for(j=1; j<6; j++)
            printf("%2d", a[i][j]);
        printf("\\n");
    }
}
```

*note: if a and b are integer.  
 then  $a/b = 0$ .  
 if  $i > j \Rightarrow j/i = 0$   
 if  $i < j \Rightarrow i/j = 0$   
 if  $i = j \Rightarrow i/j = j/i = 1$ .*

```

        return 0;
    }
A) 11111   B) 00001   C) 10000   D) 10001
   11111       00010       01000       01010
   11111       00100       00100       00100
   11111       01000       00010       01010
   11111       10000       00001       10001

```



8. Determine the output of the following program which is about Tower of Hanoi. C.

```
#include<stdio.h>

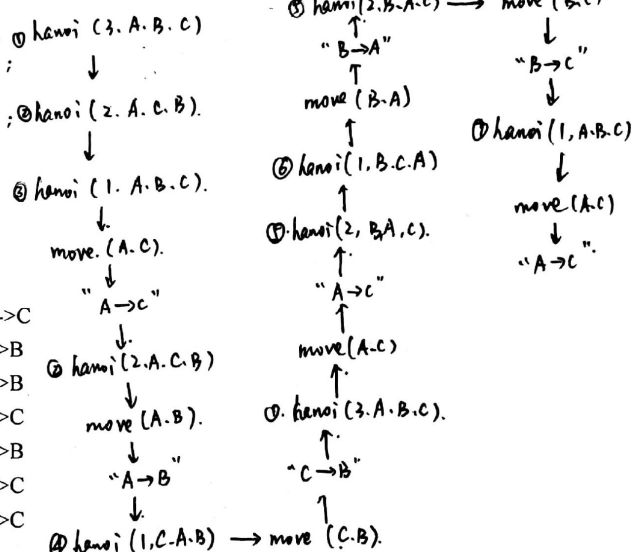
void move(char getone,char putone){
    printf("%c-->%c\n",getone,putone);
}

void hanoi(int n,char one,char two,char three){
    if(n==1) move(one,three);
    else{
        hanoi(n-1,one,three,two);
        move(one,three);
        hanoi(n-1,two,one,three);
    }
}

int main() {
    hanoi(3, 'A', 'B', 'C');
    return 0;
}
```

Handwritten notes illustrating the recursive steps for n=3:

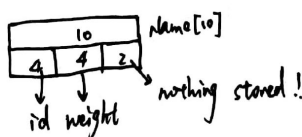
- ① hanoi (3. A. B. C)
  - ↓
  - ② hanoi (2. A. C. B)
    - ↓
    - ③ hanoi (1. A. B. C)
      - ↓
      - move. (A. C)
      - ↓
      - " "



A)A-->C	B)A-->C	C)A-->C	D)A-->C
A-->B	A-->B	A-->B	A-->B
C-->B	C-->A	C-->B	C-->B
B-->A	A-->B	A-->C	A-->C
C-->B	B-->C	B-->A	A-->B
A-->C	A-->C	B-->C	B-->C
A-->B	A-->B	A-->C	A-->C

9. Determine the output of the following program which runs on the 32-bit machine. D.

```
#include<stdio.h>
int main(){
    typedef struct{
        char name[10];
        int id;
        float weight;
    }student;
    printf("%d",sizeof(student));
    return 0;
}
```



A)14      B)16      C)18      D)20

10. As defined below, the value of  $b$  is D.

10. As defined below, the value of b is \_\_\_\_\_.

```
int a[10]={1,2,3,4,5,6,7,8,9,10}, *p=&a[3], b=p[5];
```

A) 5                      B) 6                      C) 8                      D) 9

↑                      ↑  
p[x] or \*(p+x).

## II. Fill In The Blank

1. Given the following declarations, `int x=3, y=2; float a=2.5, b=3.5;` then the value of the expression `(x+y)%2+(int)a/(int)b` is 1.

2. This program below aims to output the number of the lowercase letter, so fill in the blank and make sure it will work. `c!='\n' && c!=EOF`

```
int n=0, c;
c=getchar();
while( ) {
    if(c>='a' && c<='z') n++;
    c=getchar();
}
```

3. Determine the value of x when `a=1, b=3, c=5, d=4`. 2.

```
if(a<b)
    if(c<d) x=1;
else
    if(a<c)
        if(b<d) x=2;
        else x=3;
    else x=6;
else x=3;
```

4. Show the output of the following program. 7.

```
#include <stdio.h>
int main() {
    int s=0, k;
    for (k=7; k>=0; k--) {
        switch(k) {
            case 1:
            case 4:
            case 7: s++; break;
            case 2:
            case 3:
            case 6: break;
            case 0:
            case 5: s+=2; break;
        }
    }
    printf("%d", s);
    return 0;
}
```

注: '\0' 是一个字符, 其中 0 表示二进制数 0, '\0' 对应的二进制是 (01)8, 对应的十进制是 1。一般而言, 二进制数 0 对应的十进制是 0, 但题目中 8 不是二进制数, 故只将 '\0' 作为一个字符。故 s: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

5. When the following code is executed, how many iterations of the loop are performed? 6

```
char *s="\ta\018bc";
for( ; s!='\0'; s++);
```

6. If you would like to append something after the binary file by `fopen` function, which mode can you choose? at 以读写模式打开一个文本文件, 可以在文件末尾追加内容。

7. For the 2-dimensional array `int b[][3]={{1,0,-1},{10,12},{8,3,9},{0}}`; the value for the `b[2][1]` is 3.

b: 

1	0	-1
10	12	?
8	3	9
0		

8. Show the output of the following program. a+=b, a=11, b=10.

```
char *format="%s, a=%d, b=%d\n";
int a=1, b=10;
a+=b;
printf(format, "a+=b", a, b);
```

9. Given the following array of structure

```
struct c{
    int x;
    int y;
}s[2]={1,3,2,7};
```

`s[0].x=1`    `s[1].x=2`  
`s[0].y=3`    `s[1].y=7`

then the result of the statement `printf("%d", s[0].x*s[1].x)` is 2.

10. Determine the output of the value of b. 6

```
int a[4][2] = {1,2,3,4,5,6,7,8};
int b = (*(a + 2) + 1);
```

a: 

1	2
3	4
5	6
7	8

note: a is a pointer to pointer.  
a type of int \*\*.

### III. Programming

a[i][j]

Write a program that prints out the number of words in a sentence. A gap is defined as one or more spaces in a row, so a sequence of spaces counts as just one gap. Anything other than a space is considered to be part of a word. Here is a simple example as below:

Input: Good morning!

Output: 2

Given an incomplete program below, you can choose to fill in the blank to make it work.

Or you can write your answer but don't forget to comment out for your code.

```
#include <stdio.h>
```

```
#define N 1024
```

```
int main(){
```

```
    char sentence[N];
```

```
    int i, count=0, word=0;
```

```
    char c;
```

```
    gets(sentence);
```

```
    for(i=0; (c=sentence[i])!='\0'; i++){
```

```
        if(c==' ')
```

```
            word=0;
```

```
        else if (word==0) {
```

```
            word++; (or change word to any non-zero integer)
```

```
            count++;
```

```
        }
```

```
    }
```

```
    printf("%d\n", count);
```

```
    return 0;
```

```
}
```

G o o d M o r n i n g !  
word=1    word=1    word=0    word=1  
count=1    count=2    count=2    count=3

the value of count is added by 1 when meet the first letter of a new word!