CS111: Computer Programming
Jul-Dec 2017
Mid Sem 2
4/5/2017
Time Limit: 60 Minutes

Name: _____

Roll Number _____

This exam contains 6 pages (including this cover page) and 4 questions. Total of points is 60. **Answers to be given in this booklet itself.** All answers to be written using Blue / Black PEN only. **Figures drawn using pencil will not be evaluated. All answers to be written in the place provided. No Additional sheet is allowed.** The compiler which is considered here is the gcc compiler. Answer will be evaluated based on that.

Grade Table (for teacher use only)

Question	Points	Score
1	10	
2	20	
3	12	
4	18	
Total:	60	

Student

_____
Signature

Faculty

_____
Signature

1. (10 points) Fill in the blanks with appropriate word/ phrase.

    (a) (1 point) If an expression c = e&&f&&g, then if e is false, f and g $---$ be evaluated.

    (b) (1 point) The else portion of the if-else statement is $----$.

    (c) (1 point) The $----$ statement is used to bypass the remainder of the current pass through loop.

    (d) (1 point) A $----$ variables retains the value over multiple function calls.

    (e) (1 point) Assignment operator is $---$ to $----$ associative.

    (f) (1 point) Fall-through in switch cases is useful when we want to check $----$.

    (g) (1 point) In case of the statement $a = 1, 2, 3;$, a will have a value $----$, while $a = ---$ in case of $a = (1, 2, 3);$.

    (h) (1 point) A $----$ data structure is used to implement function call.

    (i) (1 point) When we pass an array element to a function, it is pass by $----$

    (j) (1 point) The idea of dividing a problem into smaller and similar sub-problems is called $----$.

2. (20 points) State whether the following are True/ False.

    (a) (1 point) main() takes variable number of arguments.

    (b) (1 point) A character type is a special type of short int.

    (c) (1 point) One can not have Octal or Hexadecimal integer constants in 'C'.

    (d) (1 point) All functions in 'C' must return an integer or character value.

    (e) (1 point) When a variable is passed to a function, by value, its value remains unchanged in the calling program.

    (f) (1 point) static variables are nothing but global constants.

    (g) (1 point) In a program, the statement

        #include "filename"

    is replaced by the contents of the file "filename", before compilation.

    (h) (1 point) It is possible to have nested comments in 'C'.

    (i) (1 point) Array cannot be returned by functions, however pointers to arrays can be returned.

    (j) (1 point) The operator '==' is an assignment cum increment operator in 'C'.

    (k) (1 point) In Pascal's triangle the sum of the nth row is 2^n.

    (l) (1 point) It is mandatory to include the header file in the main program if a function is defined in a separate file.

    (m) (1 point) It is advised that during compilation in "gcc", -o option should immediately be followed by the source file name.

    (n) (1 point) It is possible to have floating point statement in switch case.

(o) (1 point) while(1), paired with a break will mimic do-while loop.

(p) (1 point) Given int $a[2] = \{1, 2\};$, printf("%u and %u", $sizeof(a), sizeof(\&a[0])$); will print 8 and 8.

(q) (1 point) Relational operators have higher precedence than arithmatic operators.

(r) (1 point) The compiler will complain if you try to access array element 14 in the array A defined as int A[10].

(s) (1 point) If A[10] is an array then (A+2) points to the second element of the array.

(t) (1 point) Recursive functions provide saving in storage space.

3. (12 points) State whether the following programs will compile in gcc or not. If yes, then write the output of the program, and give reason of the output. If no, then write the reason. Answers of both parts should be correct to achieve full marks.

(a) (2 points)
```
main(){
    int a[5] = {2,3}; printf("%d %d %d",a[2],a[3],a[4]);
}
```

(b) (2 points)
```
main(){
    int i=4;
    switch(i){
      default: printf("\nI am in Jodhpur");
      case 1: printf("\nJodhpur is in Rajasthan");break;
      case 2: printf("\nIIT Jodhpur is in in the area Karwar");break;
      case 3: printf("\nFirst year, all students study Programming");break;
    }
}
```

(c) (2 points)
```
main(){
    int i=1;
    while(){
      printf("%d",i++);
      if(i>10) break;
    }
}
```

(d) (2 points)
```
main(){
    int a = myPower(2,5); printf("%d raised to %d is %d",2,5,a);
}
float myPower(int a,int b){
if(b==1) return a;
return a*power(a,b-1);
}
```

(e) (2 points)
```
main(){
    int b; b = f(20); printf("%d",b);
}
int f(int a){
  a>20 ? return (10): return(20);
}
```

(f) (2 points)
```
main(){
    static int i=5;
    if(--i){
        main();
        printf("%d ",i);
    }
}
```

---

4. (18 points) Read the questions carefully and answer to the point.

   (a) (2 points) During compilation of a code, you are getting a warning "implicit decla-
       ration of function" and an error " conflicting types for ..." for a function that you
       have written. Write two possible reasons for that?

(b) (2 points) The statement int $x = \{1, 2, 3\}$; will not yield an error, but it generates a warning, while int x; $x = \{1, 2, 3\}$, why?

(c) (2 points) Write a piece of code that will generate an error "Lvalue required"?

(d) (2 points) We know that if a called function returns a value to the calling function, we should catch it in a variable. If we don't do it, then what will happen?

(e) (2 points) "Floating point exception" is a very common run-time error. What could be possible reason for this?

(f) (2 points) To print the Floyd's triangle shown below someone has written a code.

```
1
2 3
4 5 6
7 8 9 10
void printFloydTriangle(int rowNumber, int totalRows) {
    int elementCount, counter;
    if(-----------) return;/* Exit Criteria */
    elementCount = ((rowNumber-1)*rowNumber)/2;
    for (counter = 1; counter <= rowNumber; counter++) {
        elementCount = elelemntCount+1; printf("%d ", elementCount);
    }
    printf("\n");
    printFloydTriangle(---------);   /* Recursive call */
}
```

Write appropriate statement in the blank places to make this code work, while it is called as printFloydTriangle(1,5).

(g) (2 points) Write a recurrence relation to count the number of digits in a given number. Define all the terms clearly.

(h) (4 points) Draw diagrams to show the difference between break and continue in case of while and for loop.