

```

/***** FIBONACCI.c *****/
#include <stdio.h>      /* Include C's standard I/O header file. */

int
main ()
{
    /* variable declarations */
    int A = 1;
    int B = 1;
    int C;
    int D;

    /* Print 20 Fibonacci numbers. */
    for (D = 0; 20 > D; D = D + 1) {
        printf ("%d\n", A);
        C = A + B;
        A = B;
        B = C;
    }

    /* Program finished successfully. */
    return 0;
}

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/* Program name: factorial.c, a factorial calculator */

#include <stdio.h>      /* Include C's standard I/O header file. */

int
main ()
{
    /* variable declarations */
    int number;        /* number given by user */
    int factorial;     /* factorial of user's number */

    /* Print a welcome message, followed by a blank line. */
    printf (">--- Welcome to the factorial calculator! ---<\n\n");

    /* Ask for and read the player's number into a variable. */
    printf ("What factorial shall I calculate for you today? ");
    if (1 != scanf ("%d", &number)) {
        printf ("Only integers, please.\n");
        return 3; /* Program failed. */
    }

    /* Calculate and report the answer (no overflow checking!). */
    for (factorial = number; 1 < number; number = number - 1) {
        factorial = factorial * (number - 1);
    }
    printf ("\nThe factorial is %d.\n", factorial);

    /* Program finished successfully. */
    return 0;
}

```

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/* Adapted from V. Kindratenko's notes on 30 August 2016. */

#include <stdio.h>      /* needed for printf and scanf */

int
main()
{
    int A;
    char B;
    int C;
    int D;

    printf ("Enter two numbers separated by a character: ");

    if (3 != scanf ("%d %c %d", &A, &B, &C)) {
        printf ("Please try again.\n");
        /* Program failed. */
        return 3;
    }

    if ('+' == B) {
        D = A + C;
    } else if ('-' == B) {
        D = A - C;
    } else if ('/' == B) {
        D = A / C;
    } else if ('*' == B) {
        D = A * C;
    } else {
        printf ("Invalid choice '%c'\n", B);
        /* Program failed. */
        return 2;
    }

    printf ("answer: %d\n", D);

    /* End the program successfully. */
    return 0;
}

```

```
/* solution of the quadratic equation ax^2+bx+c=0
Adapted from V. Kindratenko's notes on 30 August 2016.
*/

#include <stdio.h> /* needed for printf and scanf */
#include <math.h> /* needed for sqrtf */

int
main()
{
    float a, b, c; /* quadratic equation coefficients */
    float D; /* discriminant */
    float x1, x2; /* solution(s) */

    /* Get equation coefficients. */
    printf ("Enter a, b, and c: ");
    if (3 != scanf ("%f %f %f", &a, &b, &c)) {
        printf ("Three real coefficients are required.\n");
        return 3; /* Program failed. */
    }

    printf ("Solving equation %fx^2+%fx+%f=0.\n", a, b, c);

    /* Compute discriminant. */
    D = b * b - 4 * a * c;

    /* Compute solution. */
    if (0 < D) { /* Two real roots exist. */
        x1 = (-b + sqrtf (D)) / (2 * a);
        x2 = (-b - sqrtf (D)) / (2 * a);
        printf ("x1=%f, x2=%f\n", x1, x2);
    } else if (0 == D) { /* Only one root exists. */
        x1 = -b / (2 * a);
        printf ("x=%f\n", x1);
    } else {
        printf ("No real roots exist\n");
    }

    /* End program successfully. */
    return 0;
}
```

```
/* Compute integral of f(x) = x*x+2x+3 on [a,b].
Adapted from V. Kindratenko's notes on 30 August 2016.
*/

#include <stdio.h>

int
main()
{
    int n = 100; /* hardcoded number of Riemann sum terms */
    float a = -1.0f; /* hardcoded [a,b] */
    float b = 1.0f;
    float s = 0.0f; /* computed integral value */
    int i; /* loop counter */
    float x; /* x and y=f(x) */
    float y;
    float dx = (b - a) / n; /* width of rectangles */

    /* Sum n rectangles. */
    for (i = 0; n > i; i = i + 1) {

        /* x values are equally spaced from a to b. */
        x = a + dx * i;

        /* y values are f(x). */
        y = x * x + 2 * x + 3;

        /* Rectangle is y high and dx wide. */
        s = s + y * dx;
    }
    printf ("%f\n", s);
    return 0;
}
```