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TUGAS ALGORITMA DAN PEMROGRAMAN I

**Tugas Pendahuluan 12**

1. Buatlah algoritma prosedur dan program bahasa Pascal dan C untuk menentukan grade nilai akhir mahasiswa dengan parameter input nilai akhir(0-100) dan parameter output grade (A-E). Kriteria penentuan grade sbb:A:85-100 B:70-84 C: 55-69 D:40-54 E:0-39

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| **Bahasa Algoritmik** | **Bahasa C** | |
| **Prosedur** | | |
| **Procedure** Grade(input Nilai: | Langsung di program utama | |
| Integer, output out : Char) |
| **Kamus Data**: {tidak ada} |
| **Algoritma**: |
| **IF**(Nilai ≥ 85 **and** Nilai ≤ 100) |
| **THEN** |
| out ← 'A' |
| **ELSE** |
| **IF**(Nilai ≥ 70 **and** Nilai <= 84) |
| **THEN** |
| out ← 'B' |
| **ELSE** |
| **IF**(Nilai ≥ 55 **and** Nilai ≤ 69) |
| **THEN** |
| out ← 'C' |
| **ELSE** |
| **IF**(Nilai ≥ 40 and Nilai ≤ 54) |
| **THEN** |
| out ← 'D' |
| **ELSE** |
| **IF**(Nilai ≥ 0 and Nilai ≤ 39) |
| **THEN** |
| out ← 'E' |
| **ENDIF** |
| **ENDIF** |
| **Program Utama** | | |
| **Judul** : GradeMahasiswa | 1. #include <stdio.h> | |
| 2. #include <string.h> |  |
| **Kamus Data** :  **Procedure** Grade(input Nilai:  **Integer**, output out : **Char**) N : **Integer**  G : array[0..1] of **Char** | 3. **void** Grade(**int** Nilai, **char**\* out); | |
| 4. main() |  |
| 5. { |  |
| 6. **int** N; |  |
| 7. **char** G[1]; | |
| 8. printf("Masukkan Nilai Akhir (0-  100): "); |  |
| 9. scanf("%d", &N); | |
| **Algoritma** : | 10. **if**(N >= 0 && N <= 100) |  |
| 11. { | |
| OUTPUT('Masukkan Nilai Akhir (0- | 12. Grade(N, G); |  |
| 13. printf("Grade : %s", G); | |
| 100): ') |
| 14. }**else**{ |  |
| INPUT(N) | 15. printf("Masukkan Nilai Akhir 0-  100"); | |
| **IF**(N ≥ 0 and N ≤ 100)**THEN** |
| 16. } |  |
| Grade(N, G) | 17. } | |
| 18. **void** Grade(**int** Nilai, **char**\* out) |  |
| OUTPUT('Grade : ', G) | 19. { | |
| 20. **if**(Nilai >= 85 && Nilai <= 100) |  |
| **ELSE** | 21. { | |
| 22. strcpy(out, "A"); |  |
| OUTPUT('Masukkan Nilai Akhir 0- | 23. }**else** | |
| 24. **if**(Nilai >= 70 && Nilai <= 84) |  |
| 100 ')  **ENDIF** |
| 25. {  26. strcpy(out, "B");  27. }else  28. if(Nilai >= 55 && Nilai <= 69) 29. { 30. strcpy(out, "C");  31. }else  32. if(Nilai >= 40 && Nilai <= 54) 33. {  34. strcpy(out, "D");  35. }else  36. if(Nilai >= 0 && Nilai <= 39)  37. {  38. strcpy(out, "E");  39. }  40. } | |

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| **Bahasa Pascal** |
| program Grade;  var n : integer;  var g : char;  procedure grade(var nilai:integer; var grade:char);  begin  if (nilai >= 85) and (nilai <= 100) then  begin  grade := 'A';  end  else if (nilai >=70) and (nilai <= 84) then  begin  grade := 'B';  end  else if (nilai >=55) and (nilai <= 69) then  begin  grade := 'C';  end  else if (nilai >=40) and (nilai <= 54) then  begin  grade := 'D';  end  else if (nilai >=0) and (nilai <= 29) then  begin  grade := 'E';  end;  end;  begin  write('Masukan Nilai Akhir (0-100) : ');  read(n);  if (n >=0) and (n <= 100) then  begin  grade(n,g);  write('Grade : ',g);  end  else  write('Masukan Nilai 0-100');  end. |

2. Diketahui sebuah array tetap A={1,2,3,5,7,9,11,23,10,21,23,22,24,25,26,77}. Array tersebut dideklarasikan secara global. Buatlah algoritma prosedur dan program bahasa Pascal dan C untuk menghitung rata-rata nilai array yang jika nilai indeksnya ditambahkan 5 akan habis dibagi 4. Parameter output dari prosedur adalah rata-rata nilai array tersebut dan tanpa parameter input !

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| **Bahasa Algoritmik** | **Bahasa C** | |
| **Prosedur** | | |
| **Procedure** rata\_rata(output **out** :  **Real**) | Langsung di program utama | |
| **Kamus Data**:  total , sum : **Real**  i : **Integer** |
| **Algoritma**:  **FOR** i = 0 **TO** 16 **DO IF**((A[i]+5) **mod** 4 = 0) **THEN**  sum ← sum + A[i] total ← total + 1 **ENDIF**  **ENDFOR**  out ← sum / total |
| **Program Utama** | | |
| **Judul :** MenghitungRataRata | 1. #include <stdio.h> | |
| 2. **int** A[16] = {1,2,3,5,7,9,11,23,10,  3. 21,23,22,24,25,26,77}; |  |
| **Kamus Data** :  A : array[0..16] **of Integer**  ={1,2,3,5,7,9,11,23,10,  21,23,22,24,25,26,77}  **Procedure** rata\_rata(output out :  **Real**)  r : **Real**  G : array[0..1] **of Char** |
| 4. **void** rata\_rata(**float** \*out); | |
| 5. main() |  |
| 6. { | |
| 7. **float** r; |  |
| 8. rata\_rata(&r); | |
| 9. printf("Rata-rata : %0.2f", r); |  |
| 10. } | |
| 11. **void** rata\_rata(**float** \*out) |  |
| 12. { | |
| 13. **float** total, sum; |  |
| 14. **for**(**int** i=0;i<=16;i++) | |
| 15. { |  |
| **Algoritma** : rata\_rata(r)  OUTPUT('Rata-rata : ', r) | 16. **if**((A[i]+5) % 4 == 0) | |
| 17. { |  |
| 18. sum += A[i]; | |
| 19. total++; |  |
| 20. } | |
| 21. } |  |
| 22. \*out = sum/total; | |
| 23. } |  |
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| **Bahasa Pascal** |
| program ratarata;  var r : double;  var total,sum : double;  procedure rata\_rata(var r : double);  var a : array [1..16] of integer;  var i,temp : integer;  begin  a[1] := 1;  a[2] := 2;  a[3] := 3;  a[4] := 5;  a[5] := 7;  a[6] := 9;  a[7] := 11;  a[8] := 23;  a[9] := 10;  a[10] := 21;  a[11] := 23;  a[12] := 22;  a[13] := 24;  a[14] := 25;  a[15] := 26;  a[16] := 77;  for i:=1 to 16 do  begin  temp:= a[i] + 5;  if temp mod 4 = 0 then  begin  sum := sum + a[i];  total := total+1;  end;  end;  r := (sum/total);  end;  begin  rata\_rata(r);  write(r:4:0);  end. |

3. Buatlah algoritma prosedur dan program bahasa Pascal dan C untuk mengecek apakah sebuah kata yang diinputkan user termasuk polindrom atau tidak. Polindrom adalah kata yang jika dibalik urutan hurufnya, hasil bacanya tetap sama, contoh : katak, kasur rusak, dsb. Parameter input terhadap prosedur adalah kata dan tanpa parameter output.

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| **Bahasa Algoritmik** | **Bahasa C** | |
| **Prosedur** | | |
| **Procedure** Polindrom(input kata :  **array**[0..20]**of Char**) | Langsung di program utama | |
| **Kamus Data**:  len, i : **Integer**  kondisi : **Boolean** |
| **Algoritma**:  len ← LENGTH(kata)  **FOR** i = 0 **TO** len **DO**  **IF**(kata[i] ≠ kata[len-i-1])**THEN** kondisi ← true  i ← len **ENDIF ENDFOR**  **IF**(kondisi = false)**THEN** OUTPUT('Polindrom') **ELSE**  OUTPUT('Bukan Polindrom')  **ENDIF** |
| **Program Utama** | | |
| **Judul :** PolindromKata | 1. #include <stdio.h> | |
| **Kamus Data** :  **Procedure** Polindrom(input kata :  **array**[0..20]**of Char**)  kata : array[0..20] **of Char** | 2. #include <string.h> |  |
| 3. **void** Polindrom(**char** kata[20]); | |
| 4. main() |  |
| 5. { | |
| 6. **char** kata[20]; |  |
| **Algoritma** : OUTPUT('Masukkan kata : ') INPUT(kata) Polindrom(kata) |
| 7. printf("Masukkan kata : "); | |
| 8. scanf("%s", &kata); |  |
| 9. Polindrom(kata); | |
| 10. } |  |
| 11. **void** Polindrom(**char** kata[20]) | |
| 12. { |  |
| 13. **int** len; | |
| 14. **bool** kondisi; |  |
| 15. len = strlen(kata); | |
| 16. **for**(**int** i=0;i<=len;i++) |  |
| 17. { | |
| 18. **if**(kata[i] != kata[len-i-1]) |  |
| 19. { | |
| 20. kondisi = **true**; |  |
| 21. i = len; | |
| 22. } |  |
| 23. } | |
| 24. **if**(kondisi == **false**) |  |
| 25. { | |
| 26. printf("Polindrom"); |  |
| 27. }**else**{ | |
| 28. printf("Bukan Polindrom"); |  |
| 29. } | |
| 30. } |  |
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| **Bahasa Pascal** |
| program Polindrom;  var kata : string;  procedure polindrom(var kata : string);  var i,len : integer;  var kondisi : boolean;  begin  len := length(kata);  kondisi := false;  for i:=1 to len do  begin  if kata[i] <> kata[len] then  begin  kondisi := true;  end;  len := len-1;  end;  if kondisi then  write('Bukan Polindrom')  else  write('Polindrom');  end;  begin  read(kata);  polindrom(kata);  end. |

4. Buatlah program utama untuk memanggil prosedur pada nomor 1, 2, dan 3 menggunakan menu !

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| **Bahasa Algoritmik** | **Bahasa C** |
| **Prosedur** | |
| **Procedure** Grade(input Nilai: | Langsung di program utama |
| **Integer**, output out : **Char**) |
| **Kamus Data**: |
| {tidak ada} |
| **Algoritma**: |
| **IF**(Nilai ≥ 85 **and** Nilai ≤ 100) |
| **THEN** |
| out ← 'A' |
| **ELSE** |
| **IF**(Nilai ≥ 70 **and** Nilai ≤ 84) |
| **THEN** |
| out ← 'B' |
| **ELSE** |
| **IF**(Nilai ≥ 55 **and** Nilai ≤ 69) |
| **THEN** |
| out ← 'C' |
| **ELSE** |
| **IF**(Nilai ≥ 40 **and** Nilai ≤ 54) |
| **THEN** |
| out ← 'D' |
| **ELSE** |
| **IF**(Nilai ≥ 0 **and** Nilai ≤ 39) |
| **THEN** |
| out ← 'E' |
| **ENDIF** |
| **ENDIF** |
| **Procedure** rata\_rata(output out |
| : **Real**) |
| **Kamus Data**: |
| total , sum : **Real** |
| i : **Integer** |
| **Algoritma**: |
| **FOR** i = 0 **TO** 16 **DO** |
| **IF**((A[i]+5) **mod** 4 = 0) **THEN** |
| sum ← sum + A[i] |
| total ← total + 1 |
| **ENDIF** |
| **ENDFOR** |
| out ← sum / total |
| **Procedure** Polindrom(input kata |
| : **array**[0..20]**of Char**) |
| **Kamus Data**: |
| len, i : **Integer** |
| kondisi : **Boolean** |
| **Algoritma**: |
| len ← LENGTH(kata) |
| **FOR** i = 0 **TO** len **DO** |
| **IF**(kata[i] ≠ kata[len-i-1])**THEN** |
| kondisi ← true |
| i ← len |
| **ENDIF** |
| **ENDFOR** |
| **IF**(kondisi = false)**THEN** |
| OUTPUT('Polindrom')**ELSE** |
| OUTPUT('Bukan Polindrom') |
| **ENDIF** |

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| **Program Utama** | | |
| **Judul :** MemanggilProsedur | 1. #include <stdio.h> | |
| **Kamus Data** :  **Procedure** Grade(input Nilai: **Integer**, output out : **Char**) **Procedure** rata\_rata(output out  : **Real**)  **Procedure** Polindrom(input kata  : **array**[0..20]**of Char**)  kata : array[0..20] **of Char**  Menu, N : **Integer**  G : array[0..1] of **Char**  r : **Real** | 2. #include <iostream> |  |
| 3. #include <string.h> | |
| 4. **void** Grade(**int** Nilai, **char**\* out); |  |
| 5. **void** rata\_rata(**float** \*out); | |
| 6. **void** Polindrom(**char** kata[20]); |  |
| 7. main() | |
| 8. { |  |
| 9. **int** Menu; | |
| 1. **do** { 2. printf("Menu : \n"); |  |
| 12. printf("1. Prosedur Grade\n"); | |
| 13. printf("2. Prosedur Rata-Rata\n"); |  |
| **Algoritma** :  **REPEAT** INPUT(Menu) **DEFEND ON**(Menu)   1. : OUTPUT('Masukkan Nilai Akhir (0-100): ')   INPUT(N)  **IF**(N ≥ 0 and N ≤ 100)**THEN**  Grade(N, G) OUTPUT('Grade : ', G)  **ELSE**  OUTPUT('Masukkan Nilai Akhir 0-100')  **ENDIF**   1. : rata\_rata(r) OUTPUT('Rata-rata : ', r) 2. : OUTPUT('Masukkan kata : ') INPUT(kata) Polindrom(kata) 3. : OUTPUT('Program telah keluar!')   default : OUTPUT('Mohon masukkan no. sesuai daftar menu!')  **END DEFEND UNTIL**(Menu = 4) | 14. printf("3. Prosedur Polindrom\n"); | |
| 15. printf("4. Exit\nMasukkan No. Menu : "); |  |
| 16. scanf("%d", &Menu); | |
| 17. system("CLS"); |  |
| 18. **switch**(Menu) | |
| 19. { |  |
| 20. **case** 1 : { | |
| 21. **int** N; |  |
| 22. **char** G[1]; | |
| 23. printf("Masukkan Nilai Akhir (0-  100): "); |  |
| 24. scanf("%d", &N); | |
| 25. **if**(N >= 0 && N <= 100) |  |
| 26. { | |
| 27. Grade(N, G); |  |
| 28. printf("Grade : %s", G); | |
| 29. }**else**{ |  |
| 30. printf("Masukkan Nilai Akhir 0-100"); | |
| 31. } |  |
| 32. **break**; | |
| 33. } |  |
| 34. **case** 2 : { | |
| 35. **float** r; |  |
| 36. rata\_rata(&r); | |
| 37. printf("Rata-rata : %0.2f", r); |  |
| 38. **break**; | |
| 39. } |  |
| 40. **case** 3 : { | |
| 41. **char** kata[20]; |  |
| 42. printf("Masukkan kata : "); | |
| 43. scanf("%s", &kata); |  |
| 44. Polindrom(kata); | |
| 45. **break**; |  |
| 46. } | |
| 47. **case** 4 : { |  |
| 48. printf("Program telah keluar!"); | |
| 49. **break**; |  |
| 50. } | |
| 1. **default** : printf("Mohon masukkan no. 2. sesuai daftar menu!"); |  |
| 53. }printf("\n"); | |
| 54. }**while**(Menu != 4); |  |
| 55. } | |
| 56. **void** Grade(**int** Nilai, **char** out[0]) |  |
| 57. { | |
| 58. **if**(Nilai >= 85 && Nilai <= 100) |  |
| 59. { | |
| 60. strcpy(out, "A"); |  |
| 61. }**else** | |
| 62. **if**(Nilai >= 70 && Nilai <= 84) |  |
| 63. { | |

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|  | 64. strcpy(out, "B"); |  |
| 65. }**else** | |
| 66. **if**(Nilai >= 55 && Nilai <= 69) |  |
| 67. { | |
| 68. strcpy(out, "C"); |  |
| 69. }**else** | |
| 70. **if**(Nilai >= 40 && Nilai <= 54) |  |
| 71. { | |
| 72. strcpy(out, "D"); |  |
| 73. }**else** | |
| 74. **if**(Nilai >= 0 && Nilai <= 39) |  |
| 75. { | |
| 76. strcpy(out, "E"); |  |
| 77. } | |
| 78. } |  |
| 79. **void** rata\_rata(**float** \*out) | |
| 80. { |  |
| 81. **int** A[16] = {1,2,3,5,7,9,11,23,  82. 10,21,23,22,24,25,26,77}; | |
| 83. **float** total, sum; |  |
| 84. **for**(**int** i=0;i<=16;i++) | |
| 85. { |  |
| 86. **if**((A[i]+5) % 4 == 0) | |
| 87. { |  |
| 88. sum += A[i]; | |
| 89. total++; |  |
| 90. } | |
| 91. } |  |
| 92. \*out = sum/total; | |
| 93. } |  |
| 94. **void** Polindrom(**char** kata[20]) | |
| 95. { |  |
| 96. **int** len; | |
| 97. **bool** kondisi; |  |
| 98. len = strlen(kata); | |
| 99. **for**(**int** i=0;i<=len;i++) |  |
| 100. { | |
| 101. **if**(kata[i] != kata[len-i-1]) |  |
| 102. { | |
| 103. kondisi = **true**; |  |
| 104. i = len; | |
| 105. } |  |
| 106. } | |
| 107. **if**(kondisi == **false**) |  |
| 108. { | |
| 109. printf("Polindrom"); |  |
| 110. }**else**{ | |
| 111. printf("Bukan Polindrom");  112. }  113. } |  |
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5. Perhatikan algoritma di bawah ini !

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| **function** pangkat(input a : real, input n : integer)→ **Real** |
| **Kamus Data** : p : **Real**  i : **Integer** |
| **Algoritma** : p ← 1  **FOR** i = 1 TO n DO  p ← p \* a  **ENDFOR**  return p |

Untuk apa fungsi di atas?

a. Untuk menyederhanakan penulisan dan penyebutan suatu bilangan yang memiliki faktor-faktor perkalian yang sama.

b. Buat algoritma program utamanya !

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| **Judul** : bilanganpangkat |
|  |
| **Kamus Data** :  **function** pangkat(input a : **real**, input **n** : integer)**→ Real**  n : **Integer**  bil : **Real** |
| **Algoritma** :  INPUT(bil, n)  OUTPUT('Hasil ', bil,'^',n,' = ',pangkat(bil,n)) |

c. Ubah ke dalam program Bahasa pascal dan Bahasa C !

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| --- |
| #include <stdio.h>  float pangkat(float a, int n);  main()  {  int n;  float bil;  printf("Masukkan bilangan : "); scanf("%f", &bil);  printf("Masukkan pemangkat : "); scanf("%d", &n);  printf("Hasil %.0f^%d = %.0f ", bil, n, pangkat(bil, n));  }  float pangkat(float a, int n)  {  int i;  float p;  p = 1;  for (i = 1; i <= n; i++)  {  p = p \* a;  }  return p;  } |

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| Bahsa Pascal |
| program pangkat;  var n : integer;  var bil : double;  procedure pangkat(var a:double; var n:integer);  var i:integer;  var p : double;  begin  p := 1;  for i:=1 to n do  p := p \* a;  write(p:4:0);  end;  begin  write('Masukan Bilangan : ');  read(bil);  write('Masukan Pangkat : ');  read(n);  write('Hasil',bil:4:0,'^',n,' = '); pangkat(bil,n);  end. |

d. Ubah algoritma fungsi tersebut menjadi prosedur kemudian buat pula program utamanya !

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| **procedure** pangkat() |
| **Kamus Data :**  a, p: Real  n, i : Integer |
| **Algoritma :**  p ← 1  OUTPUT('Masukkan bilangan : ') INPUT(a)  OUTPUT('Masukkan pemangkat : ') INPUT(n)  **FOR** i = 1 **TO** n **DO**  p ← p \* a **ENDFOR** OUTPUT(p) |
| **Judul** : BilanganPangkat  **Kamus Data** : **procedure** pangkat() **Algoritma** :  pangkat() |

e. Ubah hasil prosedur yang kalian buat ke dalam program Bahasa Pascal dan Bahasa C !

* + 1. #include <stdio.h>

|  |
| --- |
| 2. **void** pangkat(); |
| 3. main() |
| 4. { |
| 5. pangkat(); |
| 6. } |
| 7. **void** pangkat() |
| 8. { |
| 9. **float** a; |
| 10. **int** n, i; |
| 11. **float** p; |
| 12. p = 1; |
| 13. printf("Masukkan bilangan : "); |
| 14. scanf("%f", &a); |
| 15. printf("Masukkan pemangkat : "); |
| 16. scanf("%d", &n); |
| 17. **for**(i=1; i<=n; i++) |
| 18. { |
| 19. p = p \* a; |
| 20. } |
| 21. printf("Hasil %.0f^%d = %.0f ", a, n, p); |
| 22. } |

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| --- |
| Bahasa Pascal |
| program pangkat;  var n : integer;  var bil : double;  procedure pangkat();  var a,p : double;  var n, i : integer;  begin  p := 1;  write('Masukan Bilangan : ');  read(a);  write('Masukan Pangkat : ');  read(n);  for i:=1 to n do  p := p \* a;  write('Hasil',bil:4:0,'^',n,' = ',p:4:0);  end;  begin  pangkat();  end. |