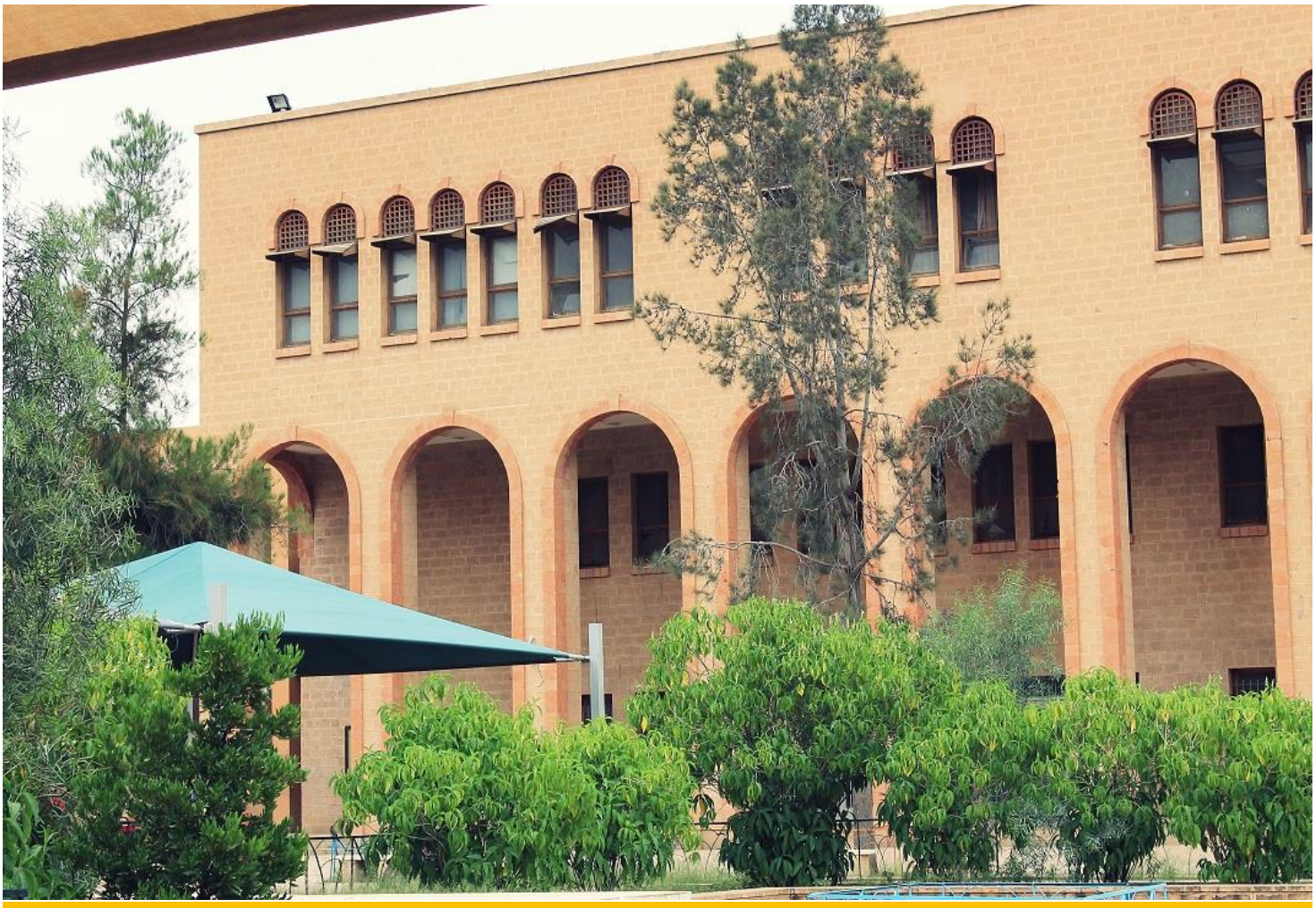
Computer Engineering Program

STUDY PLAN 2021



Sana'a University

Faculty of Engineering

Electrical Engineering Department

Computer Engineering and Control

Program Specifications

Faculty of Engineering, Sana'a University

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Computer Engineering and Control Program specifications

Program Identification and General Information	
Program Title	Computer Engineering and Control
Host Element	Sana'a University
Responsible Department	Electrical Engineering Department
Other Departments with major Teaching Contributions	Mechanical Engineering Department, Mechatronics Engineering Department
Media of Instruction	English Language
Mode of Delivery	Semesters
Total credit hours needed for completion of the program	180
Length full time	**Five academic years (two terms each - full time)**
Award granted on completion of the Program	**Bachelor of Science in Computer Engineering and Control**.
Location(s) where the program is offered	**Inside the University (Faculty of Engineering)**
Approval date:	October 2020

Vision, Mission & Aims of the Department:
Vision: Sustain the leadership locally and be excellence regionally in education and scientific research in the different fields of electrical Engineering.
Mission: Graduate qualified Engineers in Electric Power, communication and computer engineering in accordance with programs committed to the international quality standards. The Graduating Engineers handed with enough knowledge and skills necessary to meet the requirements of development as well as local and regional labor markets. Also, they able to self-development and proceed with contemporary issues. The department contribute to community wellness and the

country development through scientific research, advisory services, and training and education programs.

Aims of the Department:

1. Graduate high qualified engineers in electrical power, communication and computer engineering able to compete at national and regional levels.
2. Update undergraduate and post graduate programs and enhance the applied research environment to contribute in country development.
3. Establish partnerships with the public and private sectors and provide engineering consultancies, continuous training, teaching and awareness programs.
4. Improve the academic staff to student ratio as per standard.
5. Fill the gap in the number of assistance staff and laboratory technicians and implement training programs to enhance their skills.
6. Commit and uphold high ethical and professional conduct in the education and practice of engineering.

Program Aims

1. Strong foundation of basic sciences and mathematics and the ability to apply this knowledge to analyze and solve engineering problems.
2. Broad theoretical as well as practical knowledge related to computer and control engineering specialization.
3. Good communication skills, both orally and in writing, and ability to work effectively individually or as a team member.
4. Ability to use computer simulations tools, and software packages to design projects or systems to meet specified requirements
5. Ability to use the techniques, skills, and modern tools necessary for computer & control engineering practice.
6. Skills to propose, analyze, validate, interpret, install and maintain computer solutions in real life contexts and a variety of areas of application within an organization.
7. An understanding of professional and ethical responsibility, abilities for critical thinking, life-long learning, and updating of technical knowledge while working as professional engineers.

Graduate Attributes:

In addition to the general attributes of the Electrical Engineering, the graduate of Computer Engineering and Control program should be able to:

1- Design, implement and evaluate the components (hardware and software) of computer-based systems. 2- Employ modeling and simulation tools to monitor computer systems.

Program Intended Learning Outcomes (PILOs):
A. Knowledge and Understanding: **Upon successful completion of an undergraduate Computer Engineering and Control program, the graduates will be able to**:
A1: Demonstrate an understanding of related knowledge in mathematics and science related to Computer Engineering and Control program.
A2: Understand principles of design including elements, processes and/or systems related to Computer Engineering and Control program.
A3: Acquire knowledge of contemporary issues.
A4: Understand professional and ethical responsibilities.
B. Intellectual/ Cognitive Skills **Upon successful completion of an undergraduate Computer Engineering and Control program, the graduates will be able to**:
B1: Identify, formulate and solve engineering problems related to Computer Engineering and Control program.
B2: Analyze, interpret and evaluate data.
B3: Analyze digital & electronic systems and processes using appropriate modeling techniques
B4: Consider economic, social and environmental dimensions in engineering design related to Computer Engineering and Control program.
C. Professional and Practical Skills **Upon successful completion of an undergraduate Computer Engineering and Control program, the graduates will be able to:**
C1: Apply acquired knowledge in mathematics and science in solving engineering problems related to Computer Engineering and Control program. C2: Design, Computer and Control components or systems to meet desired specifications and imposed constraints. C3: Conduct tests related to Computer and Control Engineering practice and interpret data. C4: Use modern engineering techniques, skills and computing tools related to Computer Engineering and Control program.

D. General / Transferable Skills **Upon successful completion of an undergraduate Computer Engineering and Control program, the graduates will be able to:**
D1: Work effectively within teams.
D2: Engage in independent lifelong learning.
D3: Adopt professional and ethical responsibilities.
D4. Communicate effectively both orally and in written forms.
D5. Conduct searches of literature

System of Study	
Terms of study. Specify the structure of the academic year of study in the program, does it follow a year or semester, Total Credit hours), mode of delivery etc.,	Semester System 180 Hours
Study Credit. Specify the program structure and the distribution of Credit and average for each component of the program. Therefore the program structure should specify: Total number of hours; core requirements; elective requirements, particularly any restriction on electives; the minimum and/or maximum credit points of certain elements of the program where applicable; the requirements for activities such as field studies or professional practice, and Specify how to calculate the student GPA, etc.	
Program Requirement	**%**
• University Requirements.	17 Hours 9.4 %
• Faculty Requirements.	6 Hours 3.3 %
• Department Requirements.	25 Hours 13.8 %
• Program Requirements.	132 Hours 73.5 %
1. Admission Requirements: Specify the criteria as part of the admission process, such as percentage of secondary school, audition, placement tests, or interview.	
1- High School Certificate with not less than 80 % passing ratio.	
2- Screening test	
3- Student number capacity of 100 students per year	
2. Degree Requirements	

The purpose of this section is to describe how the way in which students progress through the program relates to the development/ achievement of the learning. (Progression Requirements in order to proceed to the next year or to obtain a degree**).**	
Year 1 to year 2:	Total Credit Hours for Year 1 (Hours) 35
Year 2 to year 3	Total Credit Hours for Year 2 (Hours) 36
Year 3 to year 4:	Total Credit Hours for Year 3 (Hours) 42
Year4 to year 5:	Total Credit Hours for Year 4 (Hours) 38
Year5 to obtain Degree	Total Credit Hours for Year 5 (Hours) 29
The specification of the degree requirements, which a student must fulfill in order to be eligible to graduate. E.g. total number of credit hours; GPA required for graduation, What awaits him/her if he/she did not achieve the accumulative GPA in semester or year ?. If a student got an Academy leave, or stop the study in the program for whatever reason, what are the requirements for continuing his/her study in the program again?, If the current version of the program is different from the previous one, where he/she studied, how you will deal with him/her with regard to the requirements of graduation?, What are the requirements for graduation from the program for the student transferring from another program, from the same university or from another university? Etc..	

Course Coding Abbreviations:

E-stands for Electrical Engineering Department
EE-stands for common courses between the programs
EPM-stands for Electrical Power and Machine Engineering Program
CN-stands for Communication and Network Engineering Program
CC-stands for Computer and Control Engineering Program
UR-stands for university requirement
FR-stands for faculty requirement
BR- stands for department requirement
ME-stands for courses offered by Mechanical Engineering Department

Study Plan 2020

The structure and content of the program should be consistent with the University's policy Structure and Requirements of the Awarded Bachelor's Degree and related to University policies.

Study Plan by Requirements:

University Requirements

No	Course No.	Course Name	اسم المقرر	CH	L	T	P
				س. م	م	ت	ع
1	UR001	Arabic Language 1	لغة عربية1	2	2	0	0
2	UR002	English Language 1	لغة انجليزية 1	2	2	0	0
3	UR003	Computer Skills	مهارات حاسوب	3	2	0	2
4	UR004	Arabic Language 2	لغة عربية 2	2	2	0	0
5	UR005	English Language 2	لغة انجليزية 2	2	2	0	0
6	UR006	Islamic Culture	ثقافة اسلامية	2	2	0	0
7	UR007	Arabic Israel Conflict	الصراع العربي الاسرائيلي	2	2	0	0
8	UR008	National Culture	الثقافة الوطنية	2	2	0	0
Total				17	16	0	2

Faculty Requirements

No	Course No.	Course Name	اسم المقرر	CH	L	T	P
				س .م	م	ت	ع
1	FR001	Mathematics 1	رياضيات 1	3	2	2	0
2	FR002	Engineering Physics	فيزياء هندسية	4	2	2	2
3	FR003	Mathematics 2	رياضيات 2	3	2	2	0
4	FR304	Engineering Project Management	إدارة مشاريع هندسية	2	1	2	0
5	FR305	Entrepreneurship & Communication Skill	ريادة اعمال ومهارات تواصل	2	1	2	0
Total				14	8	10	2

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Basic Requirements

No	Course No.	Course Name	اسم المقرر	CH	L	T	P
				س .م	م	ت	ع
1.	BR002	Engineering Workshop	ورش هندسية	3	2	0	2
2.	BR003	Engineering Drawing	رسم هندسي	3	1	0	4
3.	BR007	Engineering Mechanics	ميكانيكا هندسية	3	2	2	0
4.	BR111	Scientific English	انجليزي علمي	2	2	0	0
5.	BR112	Technical Writing	تقارير فنية	2	2	0	0
6.	BR121	Linear Algebra	جبر خطي	3	2	2	0
7.	BR122	Differential Equations	معادلات تفاضلية	3	2	2	0
8.	BR223	Engineering Mathematics	رياضيات هندسية	3	2	2	0
9.	BR231	Probability and Statistics for Engineers	الاحتمالات والاحصاء للمهندسين	2	2	0	0
Total				24	17	8	6

Elective Courses

No.	Elective No.	Course Name	اسم المقرر	Credit CH	Lec.	Tu.	Pr	Level/Semester	CODE
1.	Elective 1	Compiler Theory and Design	نظرية المترجم وتصميمة	3	2	2	-	4th Level/1st Semester	CCE347
		Computer Interfacing	واجهات الكمبيوتر	3	2	2	-		CCE334
2.	Elective 2	Cloud Technology and IoT	تقنية السحابة وانترنت الاشياء	3	2	2	-	4th Level/2nd Semester	CCE324
		Distributed and Parallel Processing	المعالجة الموزعة والمتوازية	3	2	2	-		CCE325
3.	Elective 3	Advanced Database	قواعد بيانات متقدمة	3	2	2	-	5th Level/1st Semester	CCE428
		Advanced Artificial Intelligence	ذكاء اصطناعي متقدم	3	2	2	-		CCE429
4.	Elective 4	Wireless and Wide Area Networks	الشبكات اللاسلكية والشبكات ذات النطاق الواسع	3	2	2	-	5th Level/2nd Semester	CCE453
		Industrial Automation and SCADA Systems	الأتمتة الصناعية وأنظمة SCADA	3	2	2	-		CCE438

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Course Plan/First Year

Year	Semester	Course code	Course Name	اسم المقرر	Credit CH	Lec.	Tu.	Pr.	Pre-Requ.	Co-Requ.
First Year	First Semester	BR002	Engineering Workshop	ورش هندسية	3	2	0	2	NA	(blank)
		FR002	Engineering Physics	فيزياء هندسية	4	2	2	2		(blank)
		FR001	Mathematics 1	رياضيات 1	3	2	2	0		(blank)
		UR001	Arabic Language 1	لغة عربية 1	2	2	0	0		(blank)
		UR002	English Language 1	لغة انجليزية 1	2	2	0	0		(blank)
		UR003	Computer Skills	مهارات حاسوب	3	2	0	2		(blank)
		UR007	Arabic Israeli Conflict	الصراع العربي الاسرائيلي	2	2	0	0		(blank)
	First Semester Total				**19**	**14**	**4**	**6**	First Total	
	Second Semester	BR003	Engineering Drawing	الرسم الهندسي	3	1	0	4		(blank)
		BR007	Engineering Mechanics	ميكانيكا هندسية	3	2	2	0	FR001	(blank)
		FR003	Mathematics 2	رياضيات 2	3	2	2	0		(blank)
		UR004	Arabic Language 2	لغة عربية 2	2	2	0	0	UR001	(blank)
		UR005	English Language 2	لغة انجليزية 2	2	2	0	0	UR003	(blank)
		UR006	Islamic Culture	ثقافة اسلامية	2	2	0	0	NA	(blank)
		UR008	National Culture	الثقافة الوطنية	2	2	0	0		(blank)
	Second Semester Total				**17**	**13**	**4**	**4**	Second Total	
First Year Total					**36**	**27**	**9**	**6**	**First Year Total**	

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Course Plan/Second Year

Year	Semester	Course Code	Course Name	اسم المقرر	Credit CH	Lec.	Tu.	Pr.	Pre-Requ.	Co-Requ.
Second Year	First Semester	BR111	Scientific English	انجليزي علمي	2	2	0	0	UR005	(blank)
		BR121	Linear Algebra	جبر خطي	3	2	2	0	NA	(blank)
		CCE111	Logic Circuits 1	دوائر منطقية 1	3	2	0	2		(blank)
		PME111	Electrical Circuits 1	دوائر كهربائية 1	4	2	2	2	FR002	(blank)
		CCE141	Programming Language 1 (Python)	لغة برمجة 1 (بايثون)	3	2	0	2	UR003	(blank)
		CCE142	Introduction to Computation Theory	مدخل الى نظرية الحوسبة	3	2	0	2	UR003	
	First Semester Total				**18**	**12**	**4**	**8**		
	Second Semester	BR112	Technical Writing	تقارير فنية	2	2	0	0	BR111	(blank)
		BR122	Differential Equations	معادلات تفاضلية	3	2	2	0	BR121	(blank)
		CCE112	Logic Circuits 2	دوائر منطقية 2	3	2	0	2	CCE111	(blank)
		PME112	Electrical Circuits 2	دوائر كهربائية 2	4	2	2	2	PME111	(blank)
		PME113	Electronics 1	الكترونيات 1	4	2	2	2		(blank)
		CCE143	Programming Language 2 (C/C++)	لغة برمجة 2 (سي/سي++)	3	2	0	2	CCE141	(blank)
	Second Semester Total				**19**	**12**	**6**	**8**		
Second Year Total					**37**	**24**	**10**	**16**	**Second Year Total**	

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Course Plan/Third Year

Year	Semester	Course Code	Course Name	اسم المقرر	Credit	Lec.	Tu.	Pr.	Pre-Requ.	Co-Requ.
Third Year	First Semester	BR223	Engineering Mathematics	رياضيات هندسية	3	2	2	0	BR122	(blank)
		CCE244	Programming Language 3 (Java)	لغة برمجة 3 (جافا)	3	2	0	2	CCE143	(blank)
		CCE214	Microprocessors & Assembly Language	المعالجات الدقيقة ولغة التجميع	3	2	0	2	CCE143	(blank)
		BR231	Probability and Statistics for Engineers	الاحتمالات والاحصاء للمهندسين	2	2	0	0	BR122	(blank)
		CNE214	Signals and Systems	إشارات ونظم	3	2	0	2	EE102 BR122	BR201
		PME214	Electronics 2	الكترونيات 2	4	2	2	2	PME113	EE215
	First Semester Total				**18**	**12**	**4**	**8**		
	Second Semester	CNE213	Fields Theory	نظرية المجالات	3	2	2	0	FR002	(blank)
		CCE213	Digital Electronics Circuits	دوائر الكترونية رقمية	3	2	0	2	CCE242	(blank)
		CCE246	Data Structures and Algorithms	هيكلة البيانات والخوارزميات	3	2	0	2	CCE214 EE182	(blank)
		CCE245	Hardware Design Language	لغة تصميم الحواسيب	3	2	0	2	CCE142 CCE143 CCE214	(blank)
		PME225	Electrical Machines	الات كهربائية	4	2	2	2	PME112	(blank)
		PME223	Electrical Measurements and Instrumentations	القياسات الكهربائية وتجهيزاتها	4	2	2	2	PME112	(blank)
	Second Semester Total				**20**	**12**	**6**	**10**		
	Third Year Total				**38**	**24**	**10**	**18**	**Third Year Total**	

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Course Plan/Fourth Year

Yea	Semester	Course Code	Course Name	اسم المقرر	Credit	Lec.	Tu.	Pr.	Pre-Requ.	Co-Requ.
Fourth Year	First Semester	CCE332	Analog Control Systems	نظم تحكم تماثلية	3	2	2	0	EE231	(blank)
		CCE315	Computer Architecture and Organization	معمارية وتنظيم الحاسوب	3	2	2	0	CCE246 EE182	(blank)
		CCE321	Operating Systems	نظم تشغيل	3	2	0	2	CCE245 EE182	(blank)
		CCE316	Digital Systems Design	تصميم النظم الرقمية	3	2	0	2	CCE106	(blank)
		CCE333	Digital Signal Processing	معالجة اشارات رقمية	3	2	0	2	EE231	(blank)
		CCE391	Elective Course 1	مقرر اختياري 1	3	2	2	0	NA	(blank)
		CCE335	Embedded Systems	أنظمة مدمجة	3	2	0	2	CCE106 EE242 CCE286	(blank)
	First Semester Total				**21**	**14**	**6**	**8**	First Total	
	Second Semester	CCE322	Software Engineering	هندسة برمجيات	3	2	0	2	NA	(blank)
		CCE323	Database Systems	انظمة قواعد البيانات	3	2	0	2	CCE284	(blank)
		CCE392	Elective Course 2	مقرر اختياري 2	3	2	0	2	NA	(blank)
		CCE336	Digital Control Systems	نظم تحكم رقمية	3	2	2	0	CCE332	(blank)
		CCE326	Artificial Intelligence	الذكاء الاصطناعي	3	2	0	2	CCE284	(blank)
		FR304	Engineering Project Management	إدارة مشاريع هندسية	2	1	2	0		(blank)
		FR305	Entrepreneurship & Communication Skill	ريادة اعمال ومهارات تواصل	2	1	2	0		

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	Second Semester Total	**19**	**12**	**6**	**8**	Second Total
Fourth Year Total		**40**	**26**	**12**	**16**	**Fourth Year Total**

Course Plan/Fifth Year

Year	Semester	Course code	Course Name	اسم المقرر	Credit	Lec.	Tu.	Pr.	Pre-Requ.	Co-Requ.
	First Semester	CCE437	Introduction to Robotics	مقدمة في الروبوت	3	2	2	0	CCE467 EE335	
		CCE451	Computer Networks	شبكات الحاسوب	3	2	0	2		
Fifth Year		CCE427	Digital Image Processing	معالجة الاشارات الرقمية	3	2	0	2	CCE362 CCE382	(blank)
		CCE417	Digital Computer Design	تصميم الحاسب الرقمي	3	2	0	2	~~EE333~~	(blank)
		CCE493	Elective Course 3	مقرر اختياري 3	3	2	0	2	NA	(blank)
		PME415	Graduate Project 1	مشروع التخرج 1	2	1	0	2		(blank)
	First Semester Total				**17**	**11**	**2**	**10**	First Total	
		CCE452	Information and Network Security	أمنية المعلومات والشبكات	3	2	0	2		(blank)
		CCE494	Elective Course 4	مقرر اختياري 4	3	2	0	2		(blank)
		PME416	Industrial Training	تدريب صناعي	3	1	0	4		(blank)

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		PME415	Graduate Project 2	مشروع التخرج 2	3	2	2	0		(blank)
	Second Semester Total				**12**	**7**	**2**	**8**	Second Total	
Fifth Year Total					**29**	**18**	**4**	**18**	**Fifth Year Total**	
Program Total					**180**	**119**	**44**	**78**	**Program Total**	

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